

INTERNATIONAL MEDICAL MAGAZINE.

Vol. V.]

OCTOBER, 1896.

[No. 9.]

ORIGINAL COMMUNICATIONS.

*SURGERY BEFORE THE DAYS OF ANÆSTHESIA.*¹

BY JOHN ASHHURST, JR., M.D., LL.D.,

Barton Professor of Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania Hospital, etc.

MR. PRESIDENT AND GENTLEMEN OF THE BOARD OF TRUSTEES AND HOSPITAL STAFF, LADIES AND GENTLEMEN:—A study of the condition of operative surgery before the days of anæsthesia reveals, on the one hand, a picture of heroic boldness and masterly self-control on the part of the surgeon, and, on the other, a ghastly panorama, sometimes of stoic fortitude and endurance, sometimes of abject terror and humiliation, but always of agonizing wretchedness and pain on the part of the unhappy victim, man or woman, whose necessities required a recourse to the surgeon's aid. And from our vantage-ground of a half century's experience it is difficult for us to understand why, with the constant and persistent efforts made by surgeons in past ages to lessen the pain of operations, and the gradual but continuous accumulation of facts showing that by certain agents pain could be temporarily abolished without danger, the eyes of all—patients as well as practitioners—yet seemed to be holden, and why, science and art working with a common object if independently, though the whole world seemed to be trembling on the verge of the discovery, it yet was not until fifty years ago to-day that the crucial experiment was made in this hospital, and that surgical anæsthesia became a glorious reality.

It is somewhat difficult to obtain an accurate picture of preanæsthetic

¹ An address delivered at the Massachusetts General Hospital on October 16, 1896, being the fiftieth anniversary of the first public demonstration of Surgical Anæsthesia.

surgery from the patient's point of view, probably for a similar reason to that indicated by the lion in the fable, when he criticised the artist for always representing a combat between lions and man as terminating in a human victory,—lions do not paint; and so as operations are habitually reported by surgeons and not by patients, we read of the skill and intrepidity of the operator, of difficulties met and overcome, and of victories snatched, as it were, from the very jaws of impending defeat; but we hear little of the tortures of the victim under the life-saving process, or, in an unsuccessful case, of the gradual subsidence of agonizing cries hushed in the silence of death. And yet we sometimes catch incidentally a side glimpse of an operation from the patient's stand-point, and can thus form some faint notion of the shades as well as of the high lights of capital surgery in days gone by. Those who are familiar with the history of British surgery seventy years ago will recall the famous case of "*Cooper vs. Wakley*," in which the enterprising founder and proprietor of the *Lancet* was sued and mulcted, though in but nominal damages, for the report of an operation for lithotomy performed by Sir Astley Cooper's nephew, Mr. Bransby B. Cooper. The report opens with a quotation from John Bell, referring to "long and murderous operations, where the surgeon labors for an hour in extracting the stone, to the inevitable destruction of the patient," and then having described in terms as graphic as uncomplimentary the operator's prolonged efforts to remove the calculus, and the words which showed his own anxiety and discomposure during the process, adds, "Such were the hurried exclamations of the operator. Every now and then there was a cry of Hush! which was succeeded by the stillness of death, broken only by the horrible squash, squash of the forceps in the perineum. 'Oh, let it go,—pray let it keep in! was the constant cry of the poor man.'" The patient was on the table nearly an hour, and after a night and a day of great pain "death," adds the reporter, "ended the poor fellow's sufferings, about twenty-nine hours after the operation." The fatal result appeared to have been due to peritonitis. It is, indeed, not an unheard-of thing that a surgeon's presence of mind should fail him in a difficult operation even at the present day; but at least the patient, unconscious through the blessing of anæsthesia, does not know it, and this complication is spared, to the great comfort of all concerned.

The "pitilessness" which Celsus urged as an essential trait in the operative surgeon—though Percy and Laurent declare that this pitilessness was meant to be apparent only—was indeed, before the days of anæsthesia, a feature in the surgeon's character which impressed very strongly the public generally as well as those immediately connected with the operation; and it may be feared that there are not wanting, even at this nineteenth century's end, some who would echo the comment of the younger Pliny upon the operative surgeons of his time: "They make experiments through deaths, and no head is secure from them."

It is interesting to recall that Sir James Simpson, of Edinburgh, shortly

after beginning his professional studies, was so affected by "seeing the terrible agony of a poor Highland woman under amputation of the breast that he resolved to abandon a medical career and seek other occupation; happily his intention was reconsidered, and he returned to his studies, asking himself, "Can anything be done to make operations less painful?" and, as every one knows, in less than twenty years became himself a high-priest of anæsthesia, and the introducer into surgical and obstetrical practice of ether's great rival, chloroform.

Not only did delicate women and tender children dread the ordeal of the surgeon's knife, but strong and brave men also recoiled from its use in horror. Buffon preferred death to relief from the agonies of calculus by the operation of lithotomy, and case after case is narrated by Monfalcon and other writers, in which men submitted themselves with the utmost calmness and fortitude to the hands of skilful operators, instantly falling into collapse after the first incision and without undue loss of blood quickly succumbing to the depressing effects of simple shock and pain.

No braver or more gallant gentleman ever lived than Admiral Viscount Nelson, and after his right elbow had been shattered by a French bullet in the assault at Teneriffe, he manifested the utmost courage, refusing to be taken to the nearest ship lest the sight of his injury should alarm the wife of a fellow-officer whose own fate was uncertain, and, when his own ship was reached, climbing up its side without assistance, and saying, "Tell the surgeon to make haste and get his instruments. I know I must lose my right arm, so the sooner it is off the better." "He underwent the amputation," we learn from a private letter of one of his midshipmen, "with the same firmness and courage that have always marked his character," and yet so painfully was he affected by the *coldness* of the operator's knife that, though when next going into action at the famous battle of the Nile, he could, after calmly finishing his meal, say to his officers, "By this time to-morrow I shall have gained a peerage or Westminster Abbey," yet he gave standing orders to his surgeon that *hot water* should always be kept in readiness during an engagement, so that if another operation should be required he might at least have the poor comfort of being cut with *warm* instruments.

But the most striking picture of which I am cognizant, showing the way in which an intelligent patient looked upon a surgical operation, is to be found in a letter written to Sir James Simpson by a friend, himself a member of the medical profession, who had had the misfortune to lose a limb by amputation before the introduction of anæsthetics: "I at once agreed," he says, "to submit to the operation, but asked a week to prepare for it, not with the slightest expectation that the disease would take a favorable turn in the interval, or that the anticipated horrors of the operation would become less appalling by reflection upon them, but simply because it was so probable that the operation would be followed by a fatal issue, that I wished to prepare for death and what lies beyond it, whilst

my faculties were clear and my emotions were comparatively undisturbed. . . . The week, so slow, and yet so swift in its passage, at length came to an end, and the morning of the operation arrived. . . . The operation was a more tedious one than some which involve much greater mutilation. It necessitated cruel cutting through inflamed and morbidly sensitive parts, and could not be despatched by a few strokes of the knife. . . . Of the agony it occasioned I will say nothing. Suffering so great as I underwent cannot be expressed in words, and thus, fortunately, cannot be recalled. The particular pangs are now forgotten; but the black whirlwind of emotion, the horror of great darkness, and the sense of desertion by God and man, bordering close upon despair, which swept through my mind and overwhelmed my heart, I can never forget, however gladly I would do so. Only the wish to save others some of my sufferings, makes me deliberately recall and confess the anguish and humiliation of such a personal experience; nor can I find language more sober or familiar than that I have used to express feelings which, happily for us all, are too rare as matters of general experience to have been shaped into household words. . . . During the operation, in spite of the pain it occasioned, my senses were preternaturally acute, as I have been told they generally are in patients in such circumstances. I watched all that the surgeon did with a fascinated intensity. I still recall with unwelcome vividness the spreading out of the instruments; the twisting of the tourniquet; the first incision; the fingering of the sawed bone; the sponge pressed on the flap; the tying of the blood-vessels; the stitching of the skin; and the bloody dismembered limb lying on the floor. Those are not pleasant remembrances. For a long time they haunted me, and even now they are easily resuscitated; and though they cannot bring back the suffering attending the events which gave them a place in my memory, they can occasion a suffering of their own, and be the cause of a disquiet which favors neither mental nor bodily health."

On the side of the surgeon, we find throughout the ages a constant effort to diminish the terrors of operations, and a continuous reprobation of the distressful, not to say cruel, modes of practice adopted by preceding generations. "Who can read without a kind of horror," cries Monfalcon, "the account of those frightful operations which were then practised? And yet the time is not very far distant from ours when they lopped off a limb by striking it violently with a heavy knife; that time when they knew neither how to stop nor how to prevent hemorrhage but by burning the part whence the blood jetted with boiling oil or the red-hot iron; that time when surgeons armed themselves at every moment with pincers, with burning cauteries, and with a thousand instruments the representations even of which cause terror." Will it happen that on the occasion of some future anniversary our successors will speak of our operative triumphs with the same scorn and abhorrence with which writers of the present day sometimes refer to the great deeds of our surgical forefathers?

The belief that operations might be rendered painless, and the hope that some means might be discovered by which this end should be accomplished, appear to have been present in the minds of surgeons from the earliest periods. Witness the accounts of the Memphis stone, described by Dioscorides and Pliny, which Littré surmised to have been merely marble, which by steeping in vinegar was made to give forth the fumes of carbonic acid; and of the mandragora, employed according to Theodoric, when mixed with other narcotics, by inhalation, and causing a sleep from which the patient could only be aroused by the fumes of vinegar; so profound was the stupor induced by this powerful drug that Bodin assures us that under its influence a man submitted without consciousness to a painful operation, and continued to sleep for several days thereafter. Vigo speaks of the whole body being "brought asleep by the smelling of a sponge wherein opium is," but warns his readers that the practice is dangerous because the use of opium is sometimes followed by gangrene. In his work on Natural Magic, Baptista Porta speaks of a volatile drug, kept in leaden vessels, which produced sleep when applied to the nostrils, and Perrin suggests that this may actually have been ether or some other of our modern anæsthetic agents.

Others endeavored to prevent the pain of operations by mechanical means. The Assyrians, Hoffmann assures us, compressed the veins of the neck apparently by tying a band around the part before practising circumcision, and compression of the carotid arteries was suggested as an anæsthetic measure in more modern times by Dr. Flemming; while still more recently Dr. Augustus Waller has shown that insensibility may be induced by compressing the cervical vagi. Garroters have indeed clearly shown, as remarked by Simpson, that a person may readily be choked into unconsciousness; but it is not surprising that their mode of practice has not commended itself to surgeons for general adoption. Compression of the limb by a fillet or tight ligature before amputation is referred to by Paré as a mode of alleviating the suffering which attends that procedure, and Benjamin Bell tells us that "in amputating limbs, patients frequently desire the tourniquet to be firmly screwed, from finding that it tends to diminish the pain of the operation." The same writer refers approvingly to the suggestion of Mr. James Moore that pain should be controlled by the application of a screw compressor to the principal nerve of the part, but surgeons generally appear to have agreed with Monfalcon that the inconveniences of such an apparatus fully equalled its very slight advantages.

Mental preoccupation was sometimes sought as a means of preventing pain. Richard Wiseman found that soldiers dreaded the loss of a limb much less if it were removed immediately, while they were in the "heat of fight," than if the operation were postponed until the next day; wherefore he says, "Cut it off quickly, while the soldier is heated and in mettle;" and Renaudin recalls the case of the amiable Dolomieu, who, exposed to the pangs of starvation in a Neapolitan dungeon, measurably alleviated his own

distress by engaging in the composition of a treatise on mineralogy, while his unfortunate servant and fellow-prisoner, who had not the same intellectual resources, was hungry enough for both.

But the presence of pain was not the only evil dreaded by our predecessors in attempting important operations: the great risk of fatal accident from some involuntary movement of the patient was constantly present to the mind of the conscientious surgeon. "How often," says Dr. Valentine Mott, "when operating in some deep, dark wound, along the course of some great vein, with thin walls, alternately distended and flaccid with the vital current, how often have I dreaded that some unfortunate struggle of the patient would deviate the knife a little from its proper course, and that I, who fain would be the deliverer, should involuntarily become the executioner, seeing my patient perish in my hands by the most appalling form of death! Had he been insensible, I should have felt no alarm." So greatly was the responsibility of using the knife felt by the best informed surgeons of preanæsthetic days that many, like Haller, distrusted their own manual dexterity, and declined to perform operations which, while recognizing their necessity, they felt should be left to other surgeons differently constituted from themselves. Would that a little of this Hallerian diffidence might affect some tyros of the profession in our own day, who, without the slightest preliminary practical training, do not hesitate to undertake the most hazardous procedures, and seem to consider themselves disgraced if they cannot count one or more abdominal sections, even if terminating fatally, within the accomplishments of their first year's practice!

Coming down to the days more immediately preceding the date of the great discovery, we find that opium and alcohol were the only agents which continued to be regarded as of practical value in diminishing the pain of operations, though the attendant disadvantages of their employment were of course recognized. "Previous to every painful operation," says Dorsey, "a dose of laudanum should be administered." "I was in the habit," says Dr. Mott, "of giving opiates freely before the introduction of anæsthetics, both before and after operations; . . . and opium and its preparations are the only anodynes well adapted to surgical use. No substitutes are worthy of confidence." Demme tells of a woman who, under the influence of opium, submitted to amputation at the hip-joint, and emitted but a single cry; and I myself recall distinctly patients who in the hands of that excellent surgeon, the late Dr. George W. Norris, had limbs amputated with almost no manifestation of pain when well charged previously with opium and whiskey. Alcohol, pushed to the point of producing intoxication, was employed as an anæsthetic by some surgeons, and Dorsey tell us that Dr. Physick, following Richerand's suggestion, used it successfully for its relaxing effect in a rebellious case of dislocated jaw, in which, on account of the patient's "extreme debility," it was not thought prudent to resort to the usual remedy,—"*bloodletting ad deliquium animi.*"

Meanwhile, facts were accumulating, the significance of which we can now plainly recognize, but which excited no attention at the time. Sir Humphry Davy had in the very early days of the nineteenth century experimented with nitrous oxide gas, afterwards employed by Horace Wells, and had in so many words suggested its use as an anæsthetic in minor operations; its power of preventing the sensation of pain was well known to many persons, and it was the custom at some of our medical schools—at the University of Pennsylvania for one—for students to breathe the “laughing gas,” as it was then called, for diversion. The use of ether by inhalation had been still earlier recommended by Beddoes, Pearson, and Thorton as a remedy for certain diseases of the lungs, and in 1805 your own Warren had employed it “to relieve the distress attending the last stage of pulmonary inflammation.” Its intoxicating qualities, when inhaled, and its power, when in sufficient concentration, to produce stupefaction, had been recognized in 1839 in Pereira’s well-known treatise on *materia medica*, and were quite familiar to American medical students; and it is no doubt possible—I certainly have no wish to deny it—that in isolated cases it may have been used as a means of relieving pain by individual practitioners, as by Dr. Long, of Athens, Georgia, whom Perrin, with that happy disregard of the geography of all countries except their own, which is characteristic of French writers, calls the “Greek physician.”

But yet—and yet—surgeons went on, in every country, cutting and burning, and patients went on writhing and screaming, until on the 16th day of October, in the year 1846, in the Massachusetts General Hospital, Dr. JOHN C. WARREN painlessly removed a tumor from a man who had previously been etherized by Dr. WILLIAM T. G. MORTON,—and Surgical Anæsthesia became the priceless heritage of the civilized world.

MECHANICAL WATER-FILTERS.¹

BY W. D. ROBINSON, M.D.,

Philadelphia.

My excuse for writing on this subject is because of its hygienic importance and because of the volume of evidence existing, showing that but little correct or intelligent knowledge concerning it exists among the masses of the medical profession.

The general subject of water-filtration has been much agitated in the lay press, but little has been said to give clear understanding of mechanical water-filters themselves.

¹ Presented at the meeting of the American Climatological Association, at Lakewood, New Jersey, May 13, 1896.

The construction which is preferable from a mechanical consideration, and the many different media through which filtering is done, their relative advantages and defects have scarcely been discussed at all. It would seem that what knowledge is possessed by those who have given some thought to the subject, or who have purchased filters for their homes, has been merely derived from the very questionable statements made in the circulars of or arguments of agents advertising some special device. Seriously objectionable and weak points are well covered. A part of the whole truth is thus often very deceptive. The requirements requisite in a satisfactory water-filter, as enumerated by competent authorities, are:

1. That it should yield a sufficient supply of water free from color, of crystal-like transparency, and thoroughly free from all visible matter, also all micro-organisms and organic matter in solution.

2. The filtrate should be free from all taste derived either from the solution of anything introduced to facilitate the production of an apparent satisfactory product, or from the filtering media through which the water passes.

3. The filtered water should not be rendered insipid, flat, or lifeless in taste by the treatment it has been subjected to in filtration.

4. The filter should be so constructed as to assure the filtering media being readily, perfectly, automatically cleaned at very frequent intervals. After such cleansing it should at once yield a perfect filtered water, so that the house pipes may at no time have flow into the water that is only imperfectly filtered.

5. It should be readily taken apart, so that every portion could be gotten at when required.

6. It should have present in sufficient quantity a filtering medium having the power to destroy all organic matter in solution. This should be of a character capable of retaining its power for a long period of time.

7. It should also have a medium which would arrest all organisms and their spores, and all other matter in suspension invisible.

8. The filtering medium should yield nothing to water that would favor the growth of low forms of life, should it be contaminated by spores or organisms after filtration.

9. There should be nothing in the construction or part of the filter that could undergo putrefaction or yield metallic or other impurity to the filtrate.

10. The addition of chemicals or coagulants to prepare the water should not be permitted.

11. It should yield an abundant supply of filtered water.

12. It should be simple in construction and manipulation, and the cost sufficiently low in price to render it procurable by all classes of people. In pipe connections contaminations by sewer-gas should be rendered impossible.

When strong light is made to pass through unfiltered water, the sus-

pendent matter, which may be seen in the water by the unaided eye, is not its most objectionable constituent. The real disease-producing elements are pathogenic bacteria, their excretions, and the dissolved products of their decay after death.

Bacteria have the same functions as higher organized life; they breathe, eat, excrete, and multiply, and many have the power of moving about in the water. They differ somewhat in size, but as an average it is necessary for over a hundred to be agglutinated, as in a culture-growth, before a speck large enough to be seen by the human eye without a magnifying lens is formed.

The natural life of bacteria is usually only a question of hours if its food-supply is cut off. The spores or eggs of bacteria have a very tenacious covering, and are more difficult to destroy than any other form of organic life. A dry heat of from 329° to 340° F. applied for several hours or a steam-heat at 212° F. for over four hours is required to kill them. These facts are the most important to be kept in mind in considering water-filtration. The impurities in unfiltered water visible to the unaided eye and all stain and color may be removed by imperfect filtration. A filtrate of crystal-like clearness and very pleasing appearance may be yielded, and it still may be laden with the invisible disease-producing bacteria and organic products in solution. Such water with its hidden poison is like a wolf in lamb's clothing. If all bacteria and their spores could be removed from water so protected that none could be introduced afterwards, the visible impurities of the kinds usually found could be permitted to remain without danger of producing disease in those who drink it. The greatest ill derived from visible impurities lies in the fact that they supply the food necessary to the lives of the bacteria. If water is freed from impurities and the products already in solution, bacteria cannot live in it, but will soon die by starvation. Bacteria never develop spontaneously. When they are found present in water, or anywhere else, they or their spores of necessity must first have been introduced there from some infecting source.

As a slightly analytical illustration of what is usually contained in river water supplied to cities, and because the matter which has been suspended in the water is the real medium used for filtration in many popular filters, a partial list is given below of what was found by microscopic study of matter removed from city water-supply by a filter. This study is the work of J. D. MacDonald, M.D., R.M., F.R.S.

The matter removed contained of mineral matter fine grains of carbonate of calcium, sand, flint, iron-rust, earth, etc. Of vegetable products, pollen of many grasses and weeds, fine bits of partially decayed straw, grass, weeds, leaves, wood, etc., probably derived from manure which had been scattered abroad and washed or blown by the wind into the river. Of house-refuse matter, bits of linen, vegetable products, hemp-fibre, cotton, etc. Of animal products, the ova of many varieties of minute animals of earth, air, and water environment; minute parts of disintegrated and de-

caying bodies of animals of all sizes, such as part of a leg of cockroach, of house-fly, and spider; many bits of indistinguishable wings, hooklets, eyes, abdominal organs, eggs, skins, etc. Bits of mosquitoes, silk, wool, hair of animals in large variety, epithelium scales in variety, bits of decaying flesh of striped character foreign to fresh water, scales of insects, and minute parts of moths, caterpillars, butterflies, and many insects. Bacteria in over one hundred varieties. Gelatinous fronds with embedded bacteria growing in them. Over thirty types of diatoms. An endless number of types of low forms of organisms higher in order than bacteria. Many specimens of parts of low forms of animals in order of development up to and including insects. Innumerable other things not enumerated were found. The use of such material for making the bed to be used as the filtering medium suggests *similia similibus curantur*, or a dainty dish to set before a bacterium. The objections to a mass of such deposit, supported on a framework of coarse, granular material, as a filtering medium are so evident that it will not need further mention. When a filter with such a bed becomes clogged and has to be opened to clean it, it is common to find a revolting mass of putrid decay teeming with worm-life.

Filters on the market may be divided into four classes:

Those using as the filtering medium tubes made of various different powders, such as clay, diatomaceous earth, tripoli, etc., made into masses with flour, sugar, fine wood-dust, bread, etc., and formed and baked in kilns in the manner used in producing pottery-ware. The other variety of tubes is made from porous silicious rocks, which are very soft,—little harder than chalk. Tubes from this material are formed by the use of the turning lathe.

Next is the class of filters embracing those known as packed filters, which use no coagulant to prepare the water for filtration, and consist of one or more beds of granular material, such as animal and vegetable charcoal, magnetic carbide of iron, magnetic oxide of iron, coke, oxide of manganese, and polarite.

Next to consider are packed filters using preparatory chemical coagulants. These are usually packed with gravel, sand, ground flint, pumice-stone, ground glass, etc., all in grains too coarse to be effective without the preparatory coagulant.

Of the baked or natural stone-tube variety, that known as the Berkfeld, using as the base of its composition a special deposit of earth, found only in Germany, especially rich in diatoms, has proven by scientific tests the most efficacious in removing micro-organisms, and on this account was given a medal by the Franklin Institute of Philadelphia.

It is claimed that the bacteria contained in the water are caught in the microscopic furrows and rugæ which are characteristic of these shells.

The tubes are very soft and friable, and are difficult to scrub clean, and in a few days' time the bacteria grow through the pores to the outside of the tubes, and so contaminate the water, and also gradually so occlude the

tubes as to render them useless until cleaned. These tubes are made in Germany and are too expensive for general use.

Next are the Chamberland tubes of the Pasteur filter, well known on account of very extensive advertising, and supporting statements as to their efficacy from many general hygienists, physicians, and prominent educated men who seem to have accepted the statements of the vendors *cum grano salis*.

The most prominent and competent, experienced and unbiased bacteriologists in their works and lectures all teach that the Chamberland tubes of the Pasteur filter, even when without defects in the making or in their attachments in the filter case, are only effective in removing all micro-organisms from water for from three to four days, by which time the bacteria appear on the inside of the tubes.

All tube-filters, every third day, should have the tubes scrubbed and boiled or heated to about 360° F., or have filtered through them after scrubbing some form of solution containing chlorine, or one of permanganate of potassium, followed by a solution of oxalic acid, and, of course, afterwards washed by having a quantity of filtered water made to filter through.

The friction of water going through these pores enlarging them after a few years' continuous use, so as to permit bacteria to pass, and the effect on the size of the pores of a multiple of chemical cleansings by permanganate of potassium and oxalic acid or chlorine solutions, are points worthy of further investigation.

In times of bad water these tubes, if used to any great extent, become so clogged up and sealed over by deposits that they will yield water only in slow drops or often none at all, and consequently have to be scrubbed repeatedly during a single day. These tubes are very delicate, brittle, and friable, so that breakage is an element of material expense to consider.

These tubes are made only in one size, about eight inches long by one inch in diameter, and one-sixteenth of an inch in thickness, and cost probably not more than two to five cents, but cost the purchaser one dollar each.

If every tube is not accurately and tightly in its place after the cleaning, or if a tube has received a little crack in any manner, bacteria-laden water is sure to leak in and contaminate the filtrate.

While it is true that this filter is an excellent one, if it receives all the attention it requires and the small yield is sufficient, I have enumerated these facts because physicians in general and the laity have seemed to be educated to the full conviction that if they have water which has been filtered through a Pasteur filter it is therefore necessarily sterile of all micro-organisms,—which is incorrect.

No automatic device has been or can be constructed for successfully cleaning these tubes, for simple outside cleaning of them does not suffice, as each individual pore has to be cleansed and sterilized, which can only be done by heat or chemicals. As the care of the filter is almost invariably

left to servants, who do not understand its requirements and do not fulfil them, it becomes in general use a misplaced trust. It depends exclusively on its minute pores to remove foreign matter, and has no oxidizing or other chemical action on organic matter in solution. All solutions pass through these tubes, and, as the accumulations of micro-organisms on their outer side are deposited in an excellent culture-media, the colonies grow there rapidly. The chemical products eliminated from the live bacteria ptomaines from the decay of the dead bacteria all pass through these tubes into the filtered product.

Absorbed into animal bodies the pathogenic ptomaines give rise to that form of infection known as putrid intoxication. Selini has described a series of alkaloids resembling their physiological action,—atropine, morphine, curara.

Should a filter with much accumulation on the tubes be left for a few days, the first water afterwards passing through would almost assuredly contain an appreciable quantity of ptomaines in solution. The rapidity of the multiplication of bacteria seems to be rarely appreciated. Cohn states that under favorable conditions a bacterium becomes two at the end of an hour, which multiplication, if continued for forty-eight hours, would amount to over 280,000,000,000. This, however, never occurs to such an extent, as it is modified by their own produced ptomaines, but it indicates the absolute necessity of frequent and thorough cleansing of all mechanical water-filters. Unfiltered water contains about a hundred varieties of bacteria, of which but few are pathogenic. The pathogenic are those producing typhoid fever, cholera, tuberculosis, malaria, special types of diarrhœa, and a few other less important diseases.

Filters using tubes made from tripoli- or silica-stone have more porosity than the two kinds described, therefore yield a greater supply of water.

Their relative merits in preventing the passage of bacteria do not seem to have been very positively determined. In an advertising sheet issued by the vendors of the Pasteur filter a report is made by Hartley, sanitary chemist of Indiana, in which he states that the product of the Pasteur contained no bacteria, while samples from two filters using tripoli-stone tubes yielded growths from cultures after twenty-four hours. This report smacks of having been written for the purpose for which it is used, as he does not state whether the tripoli-stones were free from defects (a common fault) or whether the stones and all receptacles, etc., of the filtered water had been fully sterilized just before the test. Four days' use of his Pasteur tube would have caused cultures to produce growths.

Before considering the mechanism of the filters using granular filtering media, the media will be tersely studied.

They may be classified into porous grains possessing the power of destroying by oxidation organic substances in solution, and porous grains which do not possess such power. Ground pumice-stone is the principal granular substance of the latter class.

Next, non-porous grains acting purely mechanically by making small interspaces when packed together. The oxidizing powders are animal and wood charcoal, spongy iron, magnetic carbide of iron, polarite, and coke.

The non-oxidizing porous powders used are gravel, sand, flint, hard blue marble, garnet stone, glass, etc. No filter could be found which used these non-oxidizing, non-porous powders in grains sufficiently fine to be affective media of themselves. They all depended on accumulations in the interspaces and on top of the bed of such matter as had been removed from the unfiltered water. For the reasons (numbered 2, 3, 6, 7, 8, 9, and 10) enumerated in the requirements of a satisfactory filter, all filters of this class should be discarded. The non-oxidizing, non-porous powders, such as gravel and cracked or ground flint, marble, glass, and garnet stone, are the granular substances used in most filters of large capacity. Gravel is of little use, being too coarse. Sand, by reason of the endless attrition to which it has been subjected, has been so rounded in individual grains as to make the interspaces when it is packed together too nearly square and round openings. Openings of the same area if long and narrow are much more obstructive to suspended matter in water. The fracture of garnet stone is too ragged and irregular to produce the most effective interspaces. In fine-ground glass excellent interspaces are secured, but the possible danger from any minute particles of glass in any way getting into the filtered water renders its use objectionable.

Hard marble is excellent and it neutralizes any acids in the water, but if it is present in too large proportion it may harden the water perceptibly. A very hard, fine-cracked flint is the best of all these substances, and it makes an interspace very narrow and obstructive. The porosity of such a bed is very great, so that its water-yield is large.

Next are granular powders which produce a chemical oxidizing action on dissolved organic matter, and so destroy the food of the disease-producing contaminations of the water and such dissolved organic matter as is pathogenic. These powders are wood charcoal, animal or bone charcoal, spongy iron, magnetic carbide of iron, polarite, coke, etc.

For a long time the greatest faith was placed in charcoal, especially animal charcoal, as a purifier and sterilizer of water when used as a filter medium, and such still remains the conviction of many people unfamiliar with the facts proven by investigations of competent scientists by modern methods of research. The following are the facts about animal charcoal to which all authorities who have investigated agree: If packed closely, in form of fine grains, in liberal quantity, it will keep back micro-organisms and oxidize organic matter in solution for twelve days. After thirty to forty days the bacteria passing through are fully five times as plentiful as in the water before filtering; they have multiplied in the grains of bone-black and been given back to the filtered water. After this time the power of oxidizing the dissolved organic matter has become extinct and can only be removed by reburning the charcoal. Its power to oxidize organic sub-

stances is limited to dead or putrefying matter, for the gases from which it has a special affinity. Live matter, such as egg albumin, passes through unchanged. It contains phosphate of lime from the bones from which it is made; this is gradually given up by solution to the filtered water, rendering it a rich field for the development of micro-organisms. Filtered water from animal charcoal will not bear storing, but, as it affords the conditions and rich food for bacterial development, it soon becomes foul and filled with visible growths. It cannot be depended on to remove from water disease-poisons. It very soon becomes an infector instead of a purifier of water, only removing the color and visible suspended matter which are least prejudicial to health. If used at all in times of bad water, the filter should be repacked with fresh material every week, and under no conditions should the packing remain longer than a month. It cannot be cleansed by washing and passing solutions through the filter. For general household use it is a deception and an abomination, and should be discarded. This is the report of Chaumont and Natter, two of the greatest authorities known on hygiene and sanitary science. As regards animal charcoal for filtration their position is fully concurred in by all competent bacteriologists and hygienists.

Coke is sometimes used. It does not affect organic constituents in solution, and gives off sulphur compounds and other metallic or earthy impurities retained from the coal from which it was made. Of the iron compounds used for filter media the magnetic carbide—very porous and containing about twelve per cent. of carbon in combination—is not only the best of the iron compounds, but the best of all the oxidizers thus far discovered. It gives off nothing objectionable to the filtered water. If kept clean by means of previous grosser filtration of the water and by the frequent breaking up of the bed and attrition of each individual grain against its fellows or against intermixed fine-ground flint, by reversed currents of water being driven through it, it retains its oxidizing power almost indefinitely and is not itself destroyed. It is so finely porous that the area of its surfaces with which water may come in contact is very great. In its action of oxidizing organic matter it acts by its great magnetic carbonized metallic surface causing the decomposition of water, liberating hydrogen and oxygen. The oxygen as oxygen and as ozone—the oxide of oxygen—which is formed oxidizes and destroys dissolved organic matter, thus removing all food for bacteria and so quickly causing their extinction. Its action can be compared to a multitude of tiny stoves in which the organic matter occurs.

Polarite is an oxide of iron, both mixed and combined with silica and aluminum, and is very much slower than the magnetic carbide, in fact too slow to be an efficient oxidizing medium for use in a filter.

Such filtering media as asbestos-fibre, wood-pulp, or paper, cotton, or linen in any form, felt, etc., do not at all comply with the requirements enumerated as requisite for a satisfactory filter, and they should never be used.

The preparation of the water for filtration should in order be studied next. This is accomplished by the addition of chemicals to change the chemical and physical properties of impurities to be removed by filtration, that they may be separated much more easily. The chemicals used are styled coagulants, and are alum, sulphate of aluminum, permanganate of potassium, sulphate of iron, sulphate of copper, fluorine salts, etc. Of late nearly all have been abandoned but alum.

The dealers in filters using coagulants assure the public that the quantity of alum used is so small and that it is so entirely decomposed that none passes through the filter, and, therefore, its use is entirely free from deleterious effect. This, unfortunately, is only part of the truth, and, therefore, is deceptive. The vendors claim that but from one-fourth grain to one grain of alum is used to each gallon of water. The most reliable authors of books on hygiene say two to six grains of alum to the gallon are used. I have been unable to find any of the filters using alum which had an automatic alum cup,—that is, one which could only supply alum to the water when water is passing through the filter. In nearly all alum-using filters these cups are attached to the upper side of the pipe supplying unfiltered water to the filter, and they have a small opening into the pipe, the size of which opening is controlled by a handle attached without. It is claimed that as the water flows through the pipe when the filter is acting the water which has entered through this small opening to the lumps of alum in the cup has made a heavy concentrated solution which naturally sinks through the small opening into the water flowing past. Were the filter constantly in operation this would probably be correct, but when not in operation, as is usual during the night and at other times for a few hours, there is nothing to prevent the concentrated alum solution flowing constantly into the water in the supply-pipe. After such rest it is certain quite an increased quantity of alum will be contained in the water first flowing into the filter. Alum is very soluble,—one part in nine of water. An experimental test was made of placing an alum cup in a vessel containing one gallon of water so that the top of the cup was just submerged, and having the alum cup charged with one pound of alum broken in large pieces and the opening in the cup just the area of a hole made by a common domestic pin, and having it stand without the least agitation for twenty-four hours. A quantitative analysis of the gallon of water was then made to learn how much alum had passed into the water through the minute hole by the force of the diffusion of liquids of different specific gravity, and it was found to be eighty-two and one-half grains.

The chemical action of alum in water is as follows :

Alum is a sulphate of aluminum and potassium or ammonium containing an excess of sulphuric acid. Unfiltered water contains carbonate of calcium or lime in solution. In the chemical reaction the aluminum and potassium are replaced by the lime, by which hydrate of aluminum and potassium are formed and sulphate of calcium and some free sulphuric acid

are formed. The sulphate of lime and sulphuric acid remain in solution and the hydrate of alumina is precipitated. The action of alum on the organic matter is chemical, and as the reaction with the lime, except that the organized substances such as albumin take the place of potassium in the reaction and are precipitated with the hydrate of alumina. In these reactions the sulphates of lime and potassium and free sulphuric acid pass through into the filtrate. One hundred and seventy grains of sulphate of lime are soluble in one gallon of water. The hydrate of alumina is extremely insoluble, and is precipitated in minute particles, which quickly come together, forming little tufts and shreds, which aggregate and sink. By this mechanical process of the hydrate of aluminum the suspended matter is caught as if by a finely meshed net and carried down.

The action of the sulphate of calcium and free sulphuric acid can be very well demonstrated by its chemical action on metals with which it comes in contact, for which the sulphuric acid has a stronger affinity than for the calcium base. It is not unusual for the thin fine brass gauze or perforated brass metal which is at the bottom of the filter-bed to support it to be gradually corroded and destroyed by this acid and salt.

The hinge-joints in the devices for automatically closing the valves in the flush-tanks of water-closets have been so corroded as to stop their action. A cessation of the trouble was secured when the use of the alum in the filter was discontinued.

The physiological effect of the long-continued ingestion of this acid in filtered water is experienced—1, when water has not been drawn for some hours, so that an excessive quantity of alum passes through; 2, when by careless adjustment of supply-valve too great a quantity of alum is permitted to pass in; 3, when there is insufficient lime or organic matter to decompose all the alum, as occurs in soft water.

Many filters have been invented intended to be adapted to use of granular beds. Many cannot be properly cleaned in any easy way and are abominations. Others are constructed on incorrect theories and are inefficient. Others are mechanical monstrosities.

The main point sought for is to devise a successful automatic arrangement by which to clean the beds. No filter should use alum, especially if it has no automatic device by which the alum is cut off when the filter is not in use. Adapting all up-to-date and authoritatively proven facts and knowledge from experience to the construction of a mechanical water-filter, it should be as follows: It should be composed of at least three distinct and separate compartments. The unfiltered water should enter the first of these, in which should be removed practically all suspended matter. In the first compartment it should filter through a bed of fine cracked flint and hardest blue marble. In this bed the water is mechanically prepared for finer filtration and chemical purification from dissolved organic matter in the next. The second bed should consist of a liberal quantity of fine-grain, hardest variety of magnetic carbide of iron intermixed with a small

quantity of very fine cracked flint. The final bed should be composed of flint in grains very much finer than any that has ever heretofore been the custom to use in a filter. This can be made to pack together very closely, so that the interspaces will be mostly of the character of an enormous number of minute slots by reason of the smooth, flat surfaces lying in close apposition.

Such a fine bed as should be used would probably be very quickly cut off by the sealing effect of the gelatinous deposit formed on it, were the water not first filtered free from all visible suspended matter and thinned by destructive oxidation of all dissolved organic matter.

It should be possible to clean each bed separately, and at different times, without in the least disturbing either other bed. The last bed should be cleansed only with water which has filtered through the two preceding beds after they have been closely settled and packed together and are performing their parts of the work effectually.

The best method of cleaning would probably be by a device which would reverse the flow of water so that it should enter at the bottom of the bed. The device should form the water in columns such as is sent from a restricted elongated nozzle. The columns of water should be directed in spiral and other directions so that every particle of the bed may be broken up and violently churned and agitated.

By some device all confusing multiplicity of valves should be done away with, and, if possible, all actions be controlled by one compound valve, with the action at each position of each movement so plainly worded on the valve that no mistake could be made in its operation by any one who could read.

No alum or chemical coagulant should be used. There seems no good reason why the breadth of the interspaces in the last bed should not be as small as the diameter of the pores in a Chamberland tube. As necessity is the mother of invention—a mother who is ever fructifying—it is entirely possible that some such filter as described will be devised and perfected by some one possessing inventive skill.

A CLINICAL STUDY OF A CASE OF DOUBLE CHORIO-RETINITIS IN THE MACULAR REGIONS, FOLLOWING A FLASH OF LIGHTNING AND A FLASH FROM BURNING LYCOPODIUM.¹

BY CHARLES A. OLIVER, A.M., M.D.,

One of the Attending Surgeons to the Wills Eye Hospital; one of the Ophthalmic Surgeons to the Philadelphia Hospital, etc.

ON the 27th of April, 1894, A. P., a twenty-year-old engraver and artist, came to my clinic at the Wills Eye Hospital, complaining of muscular and accommodative asthenopias. A week later the total error of refraction was most carefully and repeatedly obtained during several days' time by the use of atropine. Two weeks were then allowed to elapse before the formula for glasses was given. During the intervening time medium smoked coquilles were constantly worn, and no manner of near work was attempted. The correction ordered, which was for low grade or compound hyperopic astigmatism, gave an acuity of vision and a power of accommodation that were normal in each eye. Extra-ocular muscle balance for both far and near was restored from a slight esophoria to proper equilibrium.

Just after the patient left the hospital with the formula for his glasses a violent electric and rain-storm suddenly appeared. The details of what now happened cannot be better given than in the exact words of the patient's own intelligent account.

"On May 28, after being at the hospital to have the glasses examined which were ordered by Dr. Prendergast, of Dr. Oliver's clinic, I started home at 3.30 P.M. A heavy storm came up and there was a great deal of lightning.

"While I was walking on Filbert Street, between Ninth and Tenth Streets, a flash of lightning which appeared like an electric arc light (that is, it was a blinding flash) passed from left to right in front of me.

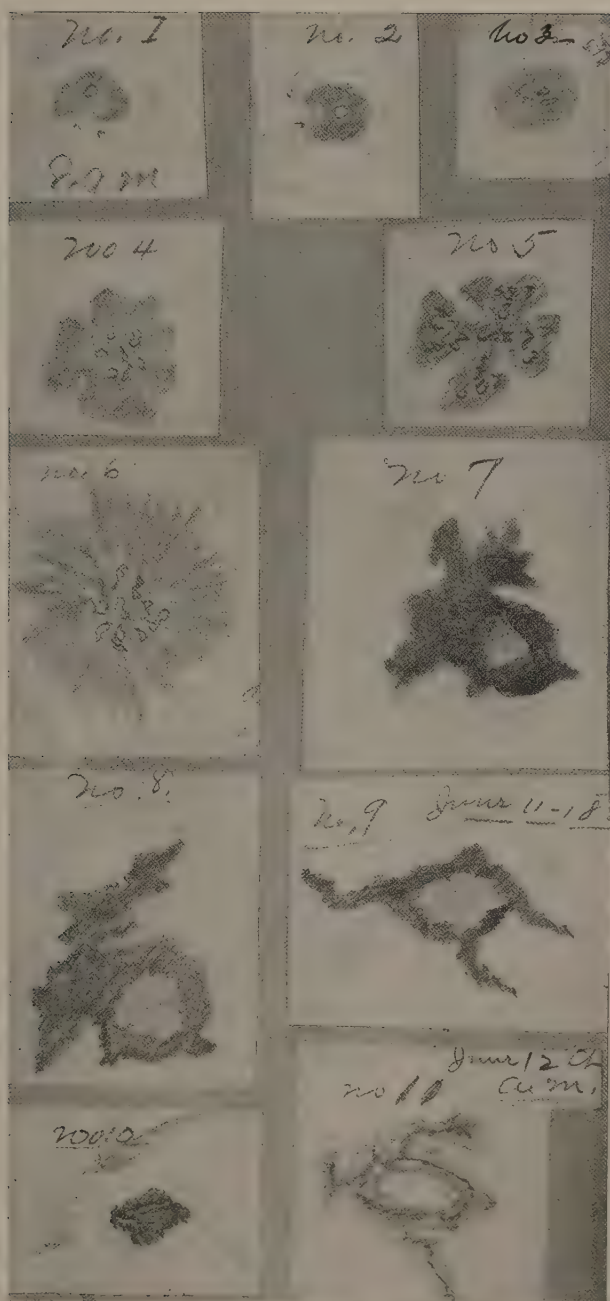
"A queer sensation came over me, and I thought every bone in my body was being wrenched from its joints, and I staggered. A horse, which was on the opposite side of the street fell, but regained his feet a moment later. For several moments I could not see; my eyesight came partially back, first in the left eye only. Gradually, in a minute or more's time, the sight returned in the right eye. I walked home apparently all right.

"That evening, about half-past nine o'clock, I was exposed to a flash of light from lycopodium coming in contact with burning alcohol. I went to bed and was so restless that I could not sleep.

"The following day I went to my work, which is that of engraving.

¹ Read before the 1896 meeting of the American Ophthalmological Society.

I.



Right eye.

I noticed on my work, or wherever I looked, that there was a small grayish spot. In the centre of this spot there was a second one about the size of a pin's head, and which was of the brightness of the sun. The central bright spot was fixed, while the grayish boundary moved rapidly in the direction shown by the arrows in the sketch.¹ (Plate I., No. 1.)

"At noon on the second day the spot changed to the shape shown in No. 2. The central spot was still bright, but the boundary was darker. The same character of motion continued as in No. 1, but it occupied a different position, as shown by the arrows.

"During the evening of the same day No. 2 spot changed entirely. The central spot, which remained bright, divided into four parts that kept constantly revolving in and through each other. The outer area had become fainter, and seemed to be made up of radiations, which rapidly moved from the centre to the edge in radiary waves. Both varieties of motion with the rapidity." (No. 3.)

The patient later stated that, during the time that these three figures were present, any series of narrow or closely-placed vertical lines would appear unequally corrugated like broken waves. The lower extremity of each broken line seemed to vibrate both to the right and left and to the left and right in a similar manner to the movement of a pendulum of a clock. Each excursion was short and the motion was very fast. The upper portions of the broken lines remained stationary.

On the afternoon of the 6th of June, just nine days after the accident, he came to me at the hospital, and I had my first opportunity of examining him. At this time he gave me the first seven sketches. He told me that the flash of lightning, which appeared purple, seemed to strike the pavement directly in front of him, and for several hours afterwards a grayish-colored area, which prevented him from seeing a man's head, persisted before each eye and then gradually disappeared. The lycopodium flash did not seem to leave any immediate after-effects. As noted in his own account of the case, the central scotomatous and irritation-area appeared on the following day and continued for seventy-two hours. For a period of three days he had very little if any trouble, although his employer had several times complained that his engraving was imperfectly done.

On the 3d of June, three days before I saw him, the irritation-scotoma again appeared before the right eye. As shown in No. 4, the patient stated that "the small brilliant spots had increased to seven, and the surrounding grayish area had become somewhat Maltese-cross shaped. The bright spots were constantly moving through one another like minute electric balls, without leaving any trail."

¹ "The spots are as I look at them, and are the exact size and shape. I have taken great pains in preparing these drawings, and they are correct."

(All of the succeeding subjective studies were made with the objects situated at twelve or more metres' distance from the eye.)

On the following day "the large spot, as partly shown in No. 5, which still remained fixed, became darker, and the included bright spots were changed into a great number of rapidly and irregularly moving hair-lines of brilliant light."

The succeeding day showed (No. 6) that a great change had taken place. The scotomatous area had become somewhat fainter, had increased in size, and had become stellate in form. The radii were massed into bundles that were situated upon different planes. The contained brilliantly-lighted lines were converted into eleven small spots of the same shape and size as the seven shown in No. 4. Like those in No. 4, the spots had become aggregated centrally, and were undergoing the same character of inosculating motion.

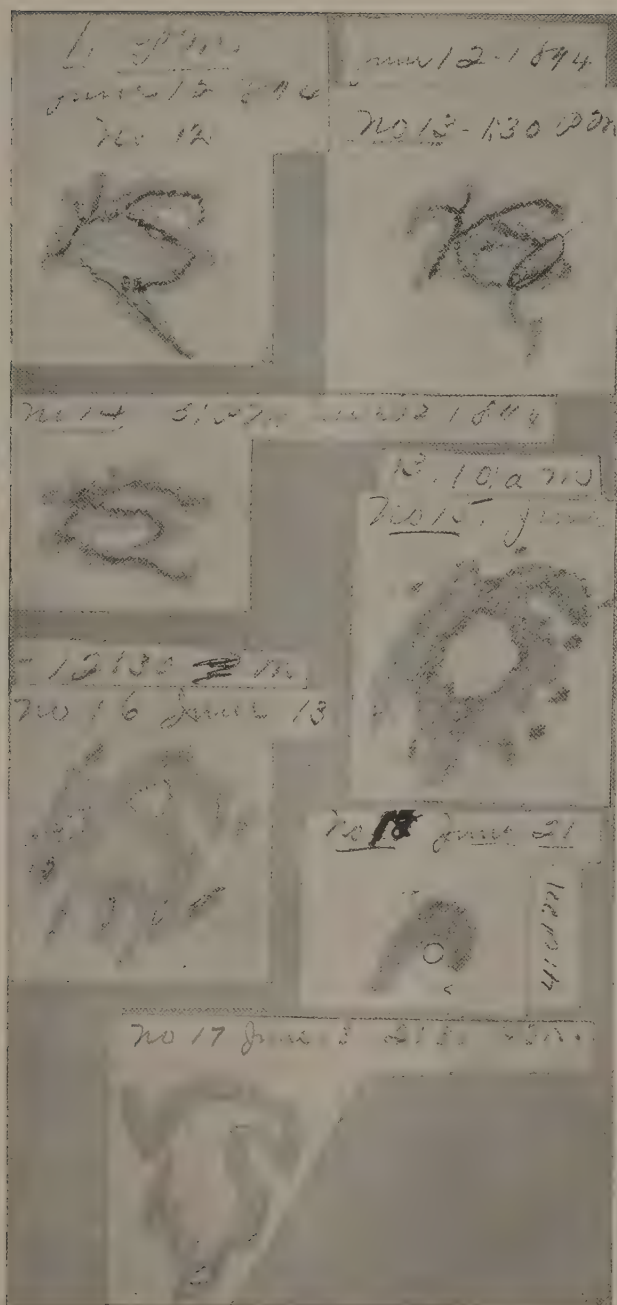
Early in the morning of the day that I saw him the remarkable change shown in No. 7 appeared. To quote from the patient's own written statement: "This change came suddenly. I had retired early the night previously, at which time the spot was like that shown in No. 6. I could not sleep much until towards morning. I arose at seven o'clock, when, to my surprise, the spot was like that shown in No. 7. The slightly eccentric light area was not brilliant, but had the appearance of frosted glass. The surrounding area was as black as ink. The large faint peripheral area seemed to me like a fog. The entire mass was motionless."

He stated that any decided movement of the left eye produced a deep-seated pain in that organ.

Central vision for form with the right eye was reduced to one-fortieth of normal. The field of vision, which was normal in size, gave marked evidences of a large irregular central scotoma that was absolute for both form and color. The pupil was the same size as that of the fellow apparently undisturbed eye, and the iris was as freely mobile to light-stimulus, accommodation, and convergence as its fellow. The left eye seemed normal in every respect. The ophthalmoscope revealed a most striking and never-to-be-forgotten picture in the right retina. Directly in the macular region the retinal tissue seemed to be slightly puffed into an irregularly flattened mass. The tissue itself did not appear to be discolored or opaque, but glistened in places as though the underlying material were composed of an extremely thin coating of cicatrizing, almost transparent jelly. No hemorrhages of any character could be detected, and no signs of degeneration of any type, except that the nerve-head was a trifle hazy and gray, could be determined.

The retina of the left eye apparently was not affected in any way, except that here, too, the nerve-head was a trifle too gray for age and was somewhat hazy.

The patient, who seemed strong and hearty, strenuously denied any syphilitic infection, and after the most careful physical examination failed to present any evidence of the disease. The only obtainable history of



systemic disturbance was that of infrequent attacks of muscular rheumatism.

In order to study the rapidly-changing symptoms, and to give his eyes a thorough rest, I admitted him into the hospital, put him to bed, and lightly, though effectually, bandaged his eyes, so as to exclude all extraneous light from their interiors. I immediately placed him upon the free use of alteratives, thoroughly purged him, and gave him light, nutritious diet.

The examinations were continued unremittingly each day, care being taken to give each eye a thorough rest before every new procedure.

On the second day of his stay in the hospital he observed that the scotomatous area had undergone a marked change for the better. This is shown in No. 8. In his own words, "There is some change in the general shape of the spot. The small white spot is a little larger, and the surrounding black area is a little lighter. The foggy appearance around the spot has disappeared." He complained that the eyeball pained him considerably. Both central and peripheral vision practically remained as before.

To his great dismay, he, for the first time since the primary momentary blinding at the time of the accident, noticed a central scotoma before the left eye. (Plate V., Fig. A.¹) He informed me that "it had appeared synchronously with the twisted, snake-like appearance before the right eye. To him it closely resembled drawing No. 3 seen with the right eye, and had the same characters of motion.

On the 11th of June, at my suggestion, he presented me with two very interesting sketches.

The scotomatous areas, studied in his ordinary way of projecting them against a distant white background,—as, for example, the clouds, a white shutter, or a pane of ground glass,—now gave him the peculiar appearance shown in No. 9. As he remarked in his report, "The color is the same as that in No. 8, but the light place in the centre is larger, and I can see a very little through it." Acting upon this suggestion, I thought that I would try and see whether any increase in the distant illumination would make a change. To his great surprise, when I had him gaze at a large area of rather brilliant orange-yellow light obtained from ordinary illuminating gas, he found that the previous light central area in the scotoma became absolutely black, and the peripheral area, which was extremely black in the previous experiment, now became quite faint and "pearl-colored." No. 10 shows very well what is meant. Several times during the experimentation, when the patient looked away from the flame, several brilliant triangular bodies which were in rapid vibration appeared in the scotomatous area.

¹ In order to more readily differentiate the varying scotomata in the two eyes, all those that belong to the right eye have been numbered, and all those that were seen by the left eye have been alphabetically arranged.

A careful drawing of the appearance of the same series of vertical lines that he had experimented with before his admission into the wards of the hospital gave the projection of a scotomatous area that was similarly shaped to No. 9 directly upon them. A peculiarity, however, that he noticed was that the lower extremity of every one of the lines above the scotoma was barbed upwardly and to the left, and the upper extremity of each of the lines below the scotoma was barbed downwardly and to the left.

On this day the general form of the scotoma before the left eye had changed to the area shown in Fig. B. The six small brilliant spots kept moving in the same manner as the spots in No. 7.

At his own request, I discharged him from the wards to the dispensary service of the hospital, ordering him to take twenty grains of iodide of potassium three times daily.

On the next morning (the 12th of June) the scotoma presented the appearance shown in No. 11. As can be seen, "the foggy atmosphere," as he was wont to call it, in which the scotoma was situated, had disappeared. The central light area had greatly cleared, and the entire spot had become fainter, this being marked by "a heavy dark vein" which ran through the central portion of the larger dark area.

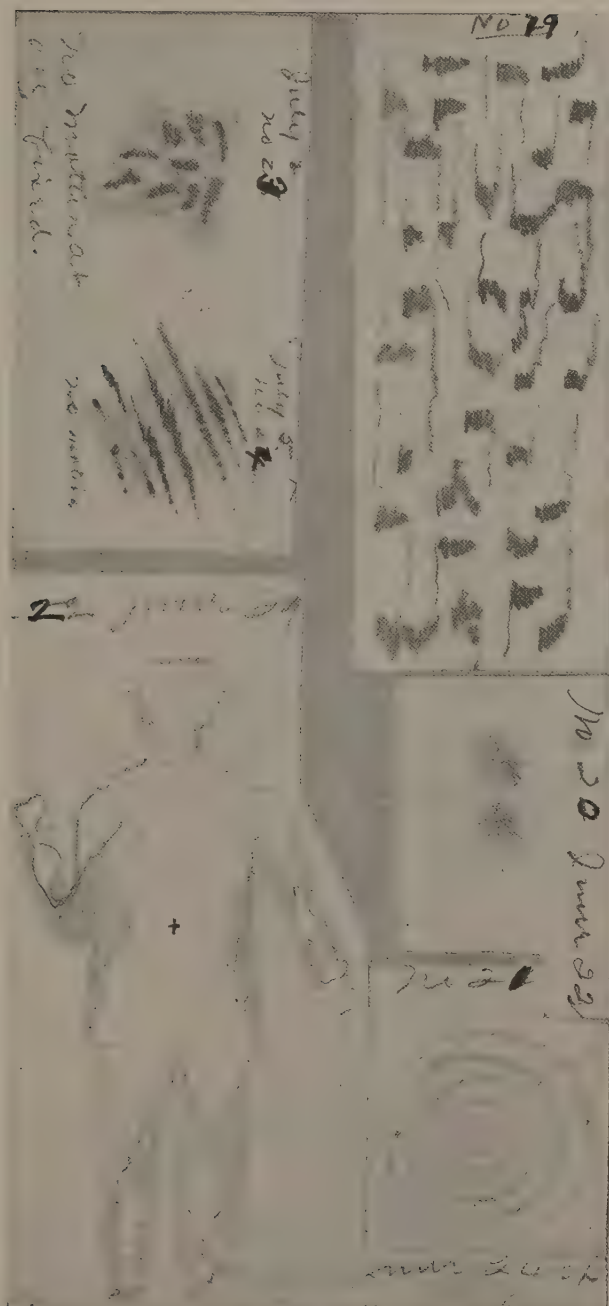
At 1 P.M. of the same day the patient made a sketch shown in No. 12, and noted: "There is some change in shape, but not in color. There are two bright spots, like miniature suns, in the lower portion of the spot, and these, which are constantly vibrating, are exceedingly annoying. The eye pains me, and seems quite inflamed."

Half an hour later the sketch of No. 13 was made. In the patient's diary I find: "The dark spot is about the same shape, but it is lighter. One bright spot has disappeared. The remaining one, instead of vibrating, throws a light up across the light area beyond the scotomatous area, leaving a series of overlapping concentric rings, somewhat like the tail of a comet."

At 5 P.M. of the same day he made the sketch for No. 14, writing: "This makes the fourth change in one day,—the most that have taken place in one day. The bright spot has gone. I can see through the small central opening, but very dimly, as though it were covered with frosted glass. Everything seen through it, though not distorted, seems to be small and very far away."

The sketch of No. 15 was made at ten o'clock the next morning. To use the patient's own language: "This morning another change has taken place, both in size and shape of the spot. It is larger, but is not any darker, than that of the previous sketch. The whole area appears like a piece of isinglass, but I cannot trace the shape correctly. By closing the eye rapidly I can see the shape. The opening is a little clearer. All objects are very small and dim. The eight small spots outside appear as though they were broken-off particles of the large spot. They are fixed."

At 12.30, at noon, he made another most interesting sketch, shown in



Right eye.

No. 16, and wrote: "Another change both in shape and size has appeared. The light spots have lessened to six, and instead of one large opening in the central blind area there is a more irregular and dimmer somewhat central one, surrounded by six little ones, four of which are situated in the prolongations."

Two hours later sketch for No. 17 was made. Describing it, he said, "Another change, both in size and shape; all of the small areas have disappeared from the outside of the spot. The sieve-like openings in the large area have all, with the exception of the lower inner one, broadened into a large central light area partaking somewhat of the same general configuration of the large dimmed area."

During this day he made two very instructive sketches, one of which was practically No. 17 projected against a series of narrow vertical lines. Not only was the scotomatous area present, but the lines themselves in the region of the scotoma were smaller, finer, and more closely packed together, thus substantiating his assertion that all objects looked at through the spot were smaller.

A curious sketch showed that a vertically held string bulged forward and appeared somewhat attenuated in front of the scotomatous area. A drawing of a horizontally placed rectangle, made while looking at the object with the right eye, exhibited the same characteristic metamorphopsia and micropsia. The ophthalmoscope showed that the macular region was surrounded by a most curiously irregular and shining rim, the enclosed area being markedly depressed in places and quite pallid, especially the fovea itself.

On the 18th of June the left scotoma, as shown in Fig. C, appeared to be divided into four dull areas "which are in constant motion. The six vibrating, brilliantly-lighted spots have disappeared."

Three days later (21st of June), at 4 P.M., the sketch shown in No. 18 came into existence. As the patient wrote: "This is the most peculiar shape and motion that I have had. It is about as dark as drawing No. 5. The small central clear spot which is fixed is about as bright as an electric arc light. The dark coma-like area surrounding it moves around the light spot in the direction shown by the arrows at about the rate of two revolutions per second. In a dark room the small central spot appears jet black and the large surrounding area is pearl white in tint. The same motion persists."

The appearance of the vertical lines at this time was so extraordinary that they are here reproduced in No. 19.

At this visit it was found that vision in the right eye had tripled $\frac{3}{40}$ whilst that of the left eye equalled full $\frac{5}{6}$. Although there were some evidences of iodism, I continued the drug just as before.

On the following day (22d of June) the spot appeared as if split into two sections and the bright area had gone (No. 20). The patient's notes state: "I cannot draw the shape of the spots unless I close the eye rapidly. They are in constant motion, like the one shown in drawing No. 3."

The vertical lines had undergone a marked change. They were not so broken, and the heavy, dense, horizontal thickenings were replaced by six broad, faint horizontal smudges.

The right fundus in the macular region seemed to have regained its natural tint, though careful focussing revealed the presence of a few faint and almost imperceptible, deeply-seated pigment splotchings and aggregations.

On the 24th of June a most curious paræsthetic area, represented in No. 21, appeared. Of this the patient wrote, "This shape stayed only for about one hour, fading to the shape shown in drawing No. 18. It has the appearance of waves of light composed of fixed radii which pass outwardly from the centre. These waves elevate and depress themselves from the centre just the same as if one threw a stone into the water,—the waves flowing from where the stone struck the water; so here the spot is similar to the waves, except that being water they are waves of light. Central vision with the right eye equalled $\frac{1}{40}$, eccentrically it rose to $\frac{5}{15}$."

On the 29th of June the sketch shown in No. 22 was made. The figure is that of a man smoking a cigar and carrying a cane as he was leaving the patient. "The white area represents the man as he appeared with the right eye while I was looking at the middle of his back. The surrounding shaded area shows him as I know what he should be."

Central vision directly ahead with the left eye equalled one-half of normal ($\frac{5}{10}$).

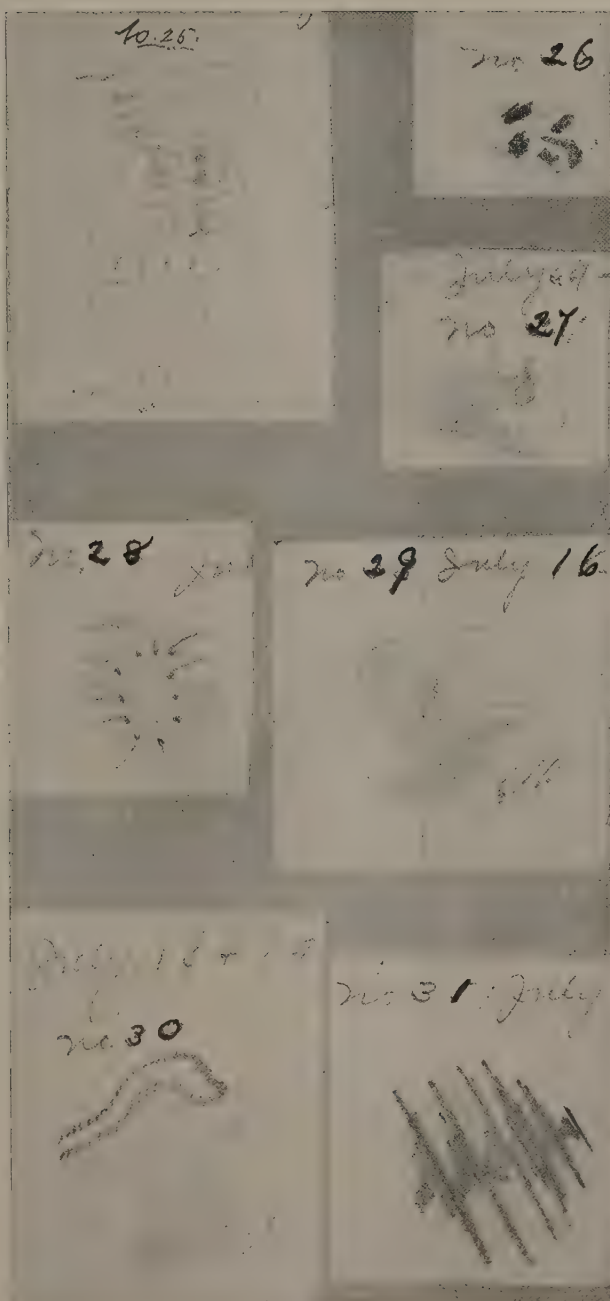
I did not see the patient again until the 2d of July. He said that he had taken the tri-daily dose of twenty grains of iodide of potassium faithfully and had not attempted to use his eyes in any way, being careful to wear his smoked glasses constantly.

At this visit he drew the sketch represented in Nos. 23 and 24. The scotomata had become fixed and all objects appeared "very small." His comments as to the sketch are as follows: "Now you can see a great difference in the two areas in regard to shape and size and the dense dark spots over them. No. 23 has eight small black spots; No. 24 has eight also, but they cut across the whole area from left to right as a series of stripes. When these bands or stripes first appeared it seemed to me that the spots actually lengthened themselves out to become stripes."

Four days later I had him make a sketch of my card of test-type which was hanging on the wall at about two metres' distance. The result is shown in No. 25. The noting at the side of the drawing read: "This shows the appearance of Dr. Oliver's card while I am looking at the letter 'O' in the upper right-hand corner."

On the 8th of July he came back very much disturbed, saying that, although the size of the general area was diminished and the dense superimposed spots reduced to five, yet these were in such a state of constant motion, just as they had been in No. 3, as to be annoying. The appearance of the fixed and superimposed mobile scotomata is shown in Fig. 26.

IV.



Right eye.

He voluntarily stated that during heavy thunder-storms, where there is much lightning, he gets demoralized and "must get into a dark room so as to prevent the right eyeball from jerking and twisting in its socket."

The next day, to his gratification, the five spots disappeared, but the gray area upon which they had seemed to rest had grown somewhat larger. No. 27 shows this very well.

On account of pronounced iodism I stopped the iodide, ordering him full doses of strychnine instead.

I missed him for another week, when he came back with the assertion that he had ignored the strychnine and had unremittingly continued his tri-daily dose of twenty grains of iodide of potassium. In spite of the marked iodism I persisted in the use of the drug.

The bright mobile spots had once more come to trouble him. The morning of his visit he had the appearance shown in No. 28.

He said that while sketching the scotomatous boundary "several bright spots shot in towards the centre from the outer edge like roman candles; in fact, they resembled them very much. After striking the centre they disappeared. This phenomenon lasted for about one minute."

Some hours after this he accidentally found that, while gazing down upon a white marble floor and drawing the scotomatous area, two eccentrically situated and fixed bright areas of light, just as "when the sun shines through the slat-work of a shutter," were projected upon the floor. The position of these light areas and the central scotomatous area are shown in No. 29.

Notwithstanding the scotoma, the eccentric vision up and in in the right eye had increased to about two-thirds of normal ($\frac{5}{7\frac{1}{2}}$).

On the succeeding second and third days the central dim area which stayed fixed became larger. The eccentric light areas, first noticed on the 16th of the month, remained equally bright, but had become a trifle smaller. At the upper border of the large dim area a brilliant and serrated worm-like mass kept in constant motion. This can be seen in No. 30.

"During the afternoon of the third day the two bright spots in the lower right-hand corner disappeared," and immediately the dense black strokes shown in No. 31 came on, they first being "lightish" and gradually becoming "darker." By the 18th of the month the four faint scotomatous areas before the left eye had practically gone. I found, however, by reference to his notes, these words: "While lying in bed on the night of this date, and being unable to sleep and very restless, I looked up at the moon, when slightly down and out from it there were two somewhat luminous objects in the sky. These were stretched out vertically, quite close to each other, and moved around the moon as I moved my head in the same direction."

One week later the spot before the left eye again came into evidence. At this time all objects immediately below the fixation point were obscured. A drawing of a man's face in profile made while he was looking at the

top of the model's nose placed the mouth and chin in the scotomatous area. Fig. D, showing the appearance of my card of distant test-type when the patient was looking at "E" "O" on the top line, will explain very well what is meant.

On the 30th of the month he told me that the objects seen through the comparatively clear areas were much larger and more nearly what they should be than before.

The notes of the 5th of September state that he was taking eighty grains of iodide of potassium daily with impunity, he having a good appetite. Nothing noteworthy was apparent until this date, when a minute, fresh hemorrhage, with its convexity directed upward, could be seen just below the left fovea, between the retina and the choroid. The macular region of the right retina was faintly granular and slightly pigmented.

He stated that the left eye had become painful during the previous night, and when he had gotten up and lit the gas he found that there was a dense black spot in the centre of its field of vision.

On the 10th of September he found that the left scotoma had become reduced, in his own words, "to a lot of faint spots, which, as near as I can explain, look like drops of water slowly flowing down a pane of glass, one trying to beat the other."

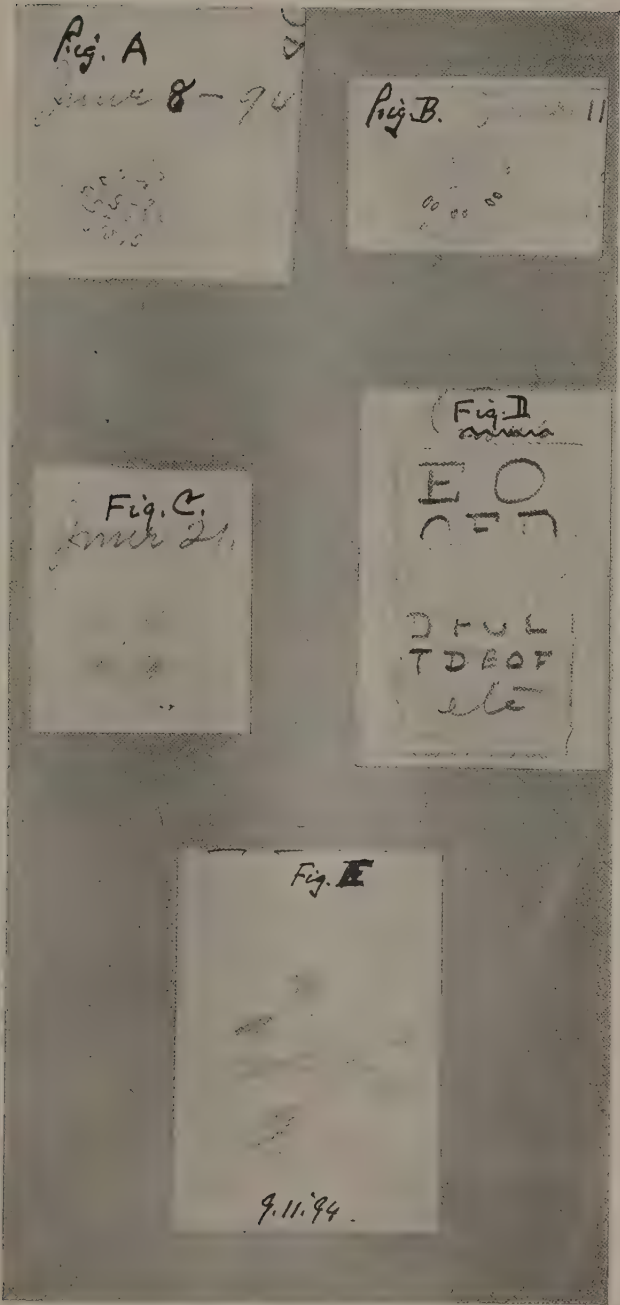
On the same day, without warning, a dim representation of No. 21, seen on the 24th of June, appeared before the right eye, and lasted for about twenty-four hours.

On the following morning he noticed that the large, dim scotoma before the right eye, which has been so persistent and fixed during the summer months, recurred; but, curiously, its edges seemed broken away and lost. Through this area, and in no other position in the field of fixation, was there any complaint of micropsia. The scotoma gradually became faintly mottled, and at last decreased in density, until a drawing made on the 9th of October showed that the area was barely discernible.

At this visit he brought sketch of Fig. E, which, as he said, showed "the shape, size, and shade of the spots in the left eye. There is no motion whatever."

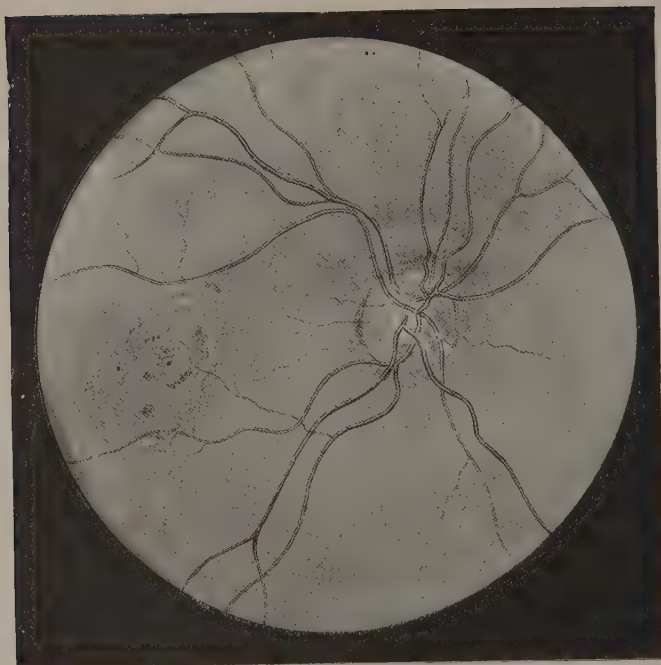
After a most rigorous examination no cardiac or renal lesion could be determined. Vision in the right eye had risen to one-half of normal, while that in the left eye was normal. When the patient regarded any object fixedly with the left eye the image of the object became alternately larger and smaller, and seemed distorted upon its edges, just "as though it were viewed through a convex lens which is successively elevated and depressed." The subretinal hemorrhage in the left eye was beginning to manifest evidences of beginning absorption.

Two weeks later the ophthalmoscope showed that there were a few faint pigment-spots in the right retina, and that the minute hemorrhage in the left subretinal tissue was nearly gone, the retina in the macular region being elevated and depressed into several almost imperceptible striæ. The



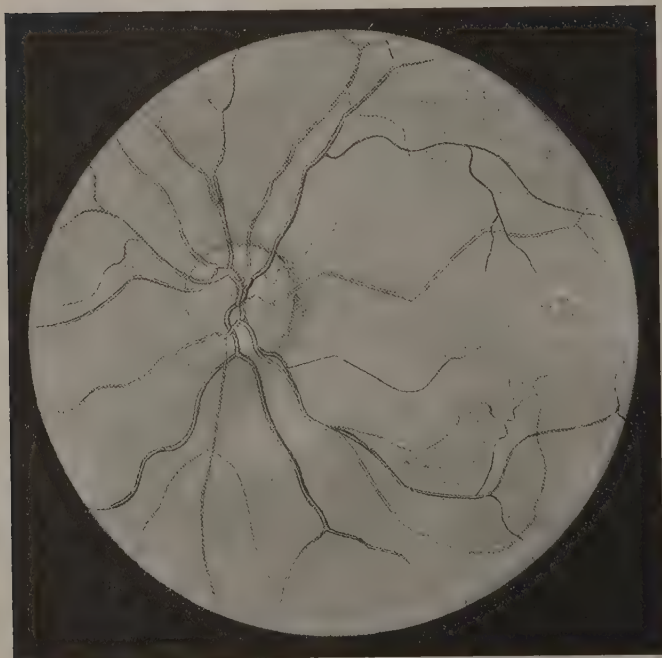
Left eye.

FIG. 1.



Ophthalmoscopic appearance of right eye-ground.

FIG. 2.



Ophthalmoscopic appearance of left eye-ground.

patient stated that he had not used any alterative for more than a week. He was told to discontinue its use.

On the 17th of October he returned with the statement that the day before he had attempted to resume his work, but found that he was compelled to desist on account of the annoying distortion and dimness of objects. A most careful correction of his minor degree of astigmatism, obtained both with and without the employment of a mydriatic, failed to relieve the condition in any way.

During the month of November he returned several times. On the 26th of the month he made some sketches showing the contracting effects upon long, narrow, rectangular forms placed at different angles in the scotomatous areas. These, which were most numerous and ingenious, will be reserved for another paper upon a related subject.

In January, 1895, the scotoma in the right eye could be just seen. He wrote, "Vertical lines are not broken or drawn together, and objects seem very little distorted." The accompanying reproductions of two faithful water-color sketches (Figs. 1 and 2) by Miss Margaretta Washington, of this city, were secured about this time. The relative conditions seen are so self-evident that written description is rendered unnecessary. The iodide of potassium was persistently continued, as much as possible, attacks of iodism, coming on very quickly and persistently, requiring constant counter-medication.

Once in February he returned with a slight, though temporary, increase in dimness in the right scotoma. At this visit he told me that the left one "had preserved the same shape and shade, but that the smaller spots were plainer (darker) and seemed to be increased in number."

His statement that at times there was some supraorbital neuralgia, and that frequently there was an irregular and vibrating mesh-work thrown between the left eye and the object looked at, induced me to make a most careful, though fruitless, examination of the media and muscular apparatus of the organ. Central vision with the right eye had steadily risen to one-fourth of normal ($\frac{5}{20}$), while that of the left eye was practically normal.

The dose of iodide of potassium, which had been taken with more or less regularity, was reduced to five grains three times daily.

On March 27 of last year, in order that I should better realize the relative difference between the two sights, he gave me two rough sketches of the same object studied from the same objective point, nearly four blocks away (the statue of William Penn upon the City Hall in Philadelphia). When study is made of these, which are reproduced in the full-page phototype (Plate VI.), it will be instantly noticed that (with the same minor degree of refractive error) the image of the right eye is much the smaller, thus substantiating in another and most graphic way his constantly-repeated assertions of micropsia. The projections of the faint scotomatous areas against the head and back of the figure and the larger size of the left scotoma are all most interesting and instructive.

In September, 1895, he returned for the removal of some dirt that had blown into his left conjunctival cul-de-sac. At that visit I embraced the opportunity of restudying his case. His vision, which was central in each eye, had risen to two-thirds of normal in the right eye and to full acuity in the left. Accommodative power and play were equally good in each eye.

He considered his right eye well. At times water-like globules would appear in the centre of the left field of vision. Careful focussing with the ophthalmoscope revealed the faintest traces of the macular changes shown in Miss Washington's sketches.

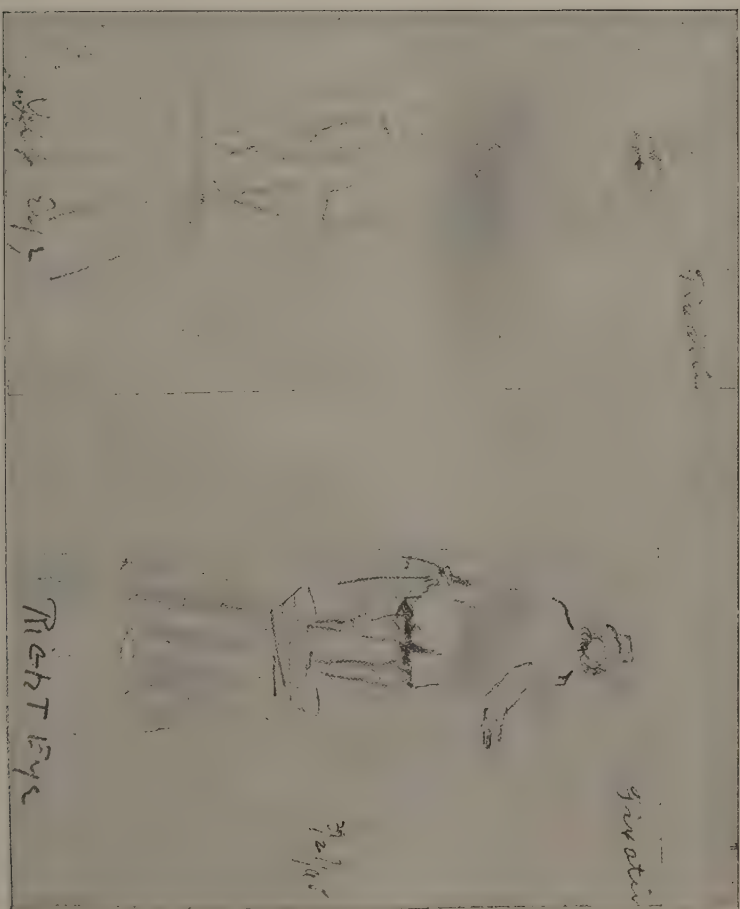
An extended re-examination the beginning of this month (July, 1896) gave practically the same findings as were noted ten months previously. A final series of characteristic sketches of geometrical forms, in which the distance between any two parallel lines (especially the horizontal ones) was made very small, showed minor degrees of bulging just at the fixation-point with the right eye, and rather more marked elevation and depression of the entire widths between the two lines away from the fixation-point with the left eye. He is now unable to project any scotoma, "any mark, blur, or spot" with the right eye, "except by looking up at a clear sky, and then only a very faint outline of the old spot appeared."

With the left eye he can project a few extremely attenuated and almost invisible grayish scotomata around and especially above the macular region, these in the carefully taken corresponding field of vision being evidenced by the faintest dim areas for color and form. The field of vision of the right eye fails to show any scotomata, but in a small area about three degrees above the fixation-point extremely minute and circular test objects appear elongated into a vertical oval.

The fields of vision, which were frequently repeated during these studies, at no time evidenced any contraction in the peripheral boundaries, the central scotomata, which were constantly absolute for color and at times negative for form, always agreeing with those that the patient made in the sketches from which the figures were taken.

REMARKS.—The present case is here given in its minutest details in order that an almost unique instance of intelligent subjective study, in combination with a fairly well-made series of clinical researches and an exact graphic reproduction of the intraocular lesion found, might be made use of by others in their studies upon such comparatively rare and quickly evanescent symptom-groupings. Uncomplicated, having been seen but a few minutes before the accident, studied carefully, and watched almost incessantly, the case assumes a certainty that entitles it to consideration.

Although the literature upon the subject has been well searched over, and much that has been done by others has not been attempted here, yet with this latter shortcoming, this clinical study is given to the ophthalmic world in the hope that it may be not altogether fruitless and useless.



The writer here desires to express his obligation to the patient himself for his untiring aid and conscientious study of the constantly varying symptoms, without which help much of the interest and value of the paper would have been lost. To the writer's several clinical assistants, especially to Dr. William Campbell Posey, his official assistant at the hospital, much credit must be given for their skilful and careful clinical handling of the case.

*THE URIC ACID DIATHESIS AND ITS EFFECT UPON
THE UPPER RESPIRATORY TRACT.¹*

BY WILLIAM F. DUDLEY, M.D.,

Brooklyn, N. Y.

It is proposed to briefly consider the factors productive of an excess of the uric acid group in the blood, and to state the effects of this dyscrasia upon the nose and throat. I venture to broach so vast a subject as the uric acid diathesis, because without an appreciation of its etiology it would be impossible to understand and relieve those of its symptoms which are evinced in the upper respiratory tract.

That uric acid exists in the blood in certain diseases is generally conceded. Garrod² proved this in 1848 by his thread experiment. He suspended a thread in fresh serum, obtained from the blood of a gouty subject, acidulated it with acetic acid, and after forty-eight hours' immersion the thread was discovered to be coated with crystals of uric acid. Levison³ enhanced the value of this demonstration by suspending threads in ascitic fluid, and gradually adding uric acid. He found that a one to four-thousand solution deposited no crystals on the thread, a one to two-thousand solution gave up a few crystals, and a one to one-thousand solution covered the thread with a large number of crystals.

Von Jaksch⁴ examined the blood of a number of diseased person with varying results. Twenty-one cases of diseases of the nervous system showed no uric acid in the blood. In ten typhoids none was found. In seven cases of anæmia with increase of the number of leucocytes, uric acid was found. Nine cases of Bright's disease out of eleven examined yielded a considerable quantity of uric acid. That uric acid cannot be estimated in healthy blood is due to the difficulty of obtaining the large quantities required for the analysis and to the rapid chemical combinations that take

¹ Read before the American Climatological Association, May 12, 1896.

² Garrod, *A Treatise on Gout and Rheumatism*, 1876.

³ F. Levison, *The Uric Acid Diathesis*, p. 40.

⁴ Von Jaksch, *Ueber die klinische Bedeutung von Harnsäure im Blut*, 1890.

place. But it has been proved conclusively by Horbaczewski¹ that uric acid can be derived from the tissues of nearly all the organs in man and in lower animals. The lungs, liver, mucous membrane of the intestines, and the spleen all yielded this substance; in the latter organ two and a half milligrammes of uric acid were produced from one gramme of spleen pulp. He extracted the nuclein from each tissue to be examined by artificial digestion, and from the nuclein obtained he derived xanthin, hypoxanthin, and uric acid.

Horbaczewski has shown by his accurate experiments that body tissues that contain no free uric acid nevertheless possess a nitrogenous substance from which it can be artificially extracted, and from which it is fair to presume uric acid is evolved during life. This substance is the nuclein of cells, and this he regards as the generator of uric acid. He found further that nuclein introduced into the body, either in the food or in a weak alkaline solution hypodermically, increased the amount of uric acid eliminated. One-fourth gramme of nuclein was injected into a rabbit normally excreting seven milligrammes of uric acid daily, and in the following twenty-four hours twenty-five and eight-tenths milligrammes of uric acid were found in the urine.

Maress² administered five and one-half grammes of nuclein to a man deprived of food for the previous eighteen hours, nuclein being more effective while fasting. During the two hours before taking the nuclein, eighty-one cubic centimetres of urine contained forty-six milligrammes of uric acid, and during the fourth and fifth hour after taking the nuclein one hundred and forty-eight cubic centimetres of urine yielded ninety-three milligrammes of uric acid.

Levison, in his book on "The Uric Acid Diathesis," from which the data given have been taken, states that it is impossible that the characteristic cells of the tissues can be so rapidly disintegrated as to produce such marked variations of uric acid as occur during life, and believes that *leucocytes*, which are omnipresent in the body, are the cells which undergo metamorphosis, and that they furnish the uric acid, and are, therefore, the key to the solution of the problem. Thus he explains the increase of uric acid found after eating as due to a temporary leucocytosis, from digestive activity occurring before it is possible for the increase to be derived from the ingested food, that not having been assimilated.

In young children's blood leucocytes are much more numerous normally than in later life; and in infant's urine the relation of uric acid to urea is one to nine, whereas in adults it is one to thirty or thirty-five.

Tyson³ says the most frequent sediment in the new-born is uric acid, and red and sand-like crystals are at times found in the first urine discharged.

¹ Horbaczewski, reported by Levison, loc. cit., p. 201.

² Maress, Levison, loc. cit., pp. 9-24.

³ Tyson, American Text-book of Diseases of Children, p. 978.

In adults the administration of pilocarpine and the continued use of alcohol¹ increases the number of leucocytes in the blood, and a corresponding increase of the amount of uric acid excreted is found. Excessive physical and mental exertion will produce the same results. Conversely, quinine and atropine diminish the number of leucocytes in the blood, and less than the usual quantity of uric acid is passed in the urine. In healthy urine the ratio of uric acid to urea is about one to thirty in the adult; but this proportion is subject to frequent and marked variations, which may be temporary or permanent. Internal nutrition is a process of oxidation; the exact chemical changes which are effected are not clearly understood. Bence Jones² positively advanced the theory that all albuminoids in the blood are converted into uric acid, and when oxidation is complete are finally eliminated as urea, carbonic acid gas, and water; and that when an excess of uric acid appeared in the urine it was due to suboxidation, and that it indicated an incomplete chemical change of uric acid into neutral urea. It is now claimed,³ as the result of the investigations previously cited, that the relation of uric acid to urea is less close and less simple. Uric acid is regarded as the resultant of tissue metamorphosis. Urea is derived from the ingested food, and the quantity of urea in the urine is influenced by the nature of the nourishment taken. The temporary increase of uric acid following eating is therefore due to a digestive leucocytosis. The use of either carbohydrates or nitrogenous food causes scarcely any fluctuation in the amount of uric acid excreted, while the urea can be doubled by a meal of albuminoids.

While there exists much variance regarding the chemical origin and relationship of uric acid and urea, there is but little lack of harmony concerning the evil results of their excess in the blood, whether that excess be due to an over-production or a faulty elimination.

It has been claimed by Fetz and Ritter⁴ that urea is not the fatal poison in uræmia. They injected urea into the vessels of animals without producing fatal toxæmia, but Gréhant and Quinquaud⁵ later caused uræmic convulsions and death in rabbits and dogs by injecting, subcutaneously, urea in an amount equal to $\frac{1}{200}$ of the body-weight. That other poisonous waste products are excreted is proved by the fact that more acute and fatal results can be obtained by injecting into the blood uræmic urine than by using an equivalent of pure urea. Ptomaines have also been credited with the causation of the toxic symptoms. They exist in healthy blood and are decidedly multiplied in numbers during disease. That ptomaines and other toxins of unknown composition are augmented in disease is undeniable.

¹ Levison, loc. cit., p. 36.

² Bence Jones, *Journal of the Chemical Society*, 1862, p. 212.

³ Levison, loc. cit., p. 24.

⁴ Feltz and Ritter, quoted by D. J. Hamilton, *Text-Book of Pathology*, vol. i. p. 548.

⁵ Gréhant and Quinquaud, reported by Hamilton, loc. cit.

That they play no slight or harmless part in the economy, when retained, is very probable. But it would seem wisest, in the absence of definite information concerning their history, to consider most carefully as etiological factors urea and the uric acid groups, for about them we have some definite knowledge, and they, therefore, offer the best opportunities for logical clinical explanations and successful treatment.

That production of uric acid and urea in excess of normal occurs is most evident. Unless the excess be long continued or too great for excretion, it results in no harm. It is also true that normal production associated with perfect elimination will effect injury. Any insufficient removal of these excrementitious products by the natural channel, the kidneys, is therefore the condition indicative of danger.

The general consideration of this diathesis is passed with a full appreciation of the inadequacy of my effort to offer for your discussion those theories of the source of the uric acid group, and the causes of its presence in the system in excess of normal.

That impairment of the function of every vital tissue may result from this excess is obvious, yet like other dyscrasias it has localized areas of special selection for its clinical manifestations. The upper respiratory tract is chosen for closer investigation, not because the most serious effects are found there, but from the fact that this sensitive and susceptible tract gives early and persistent symptoms of the existence of the constitutional defect, and also because the dependence of these symptoms upon the general health is not sufficiently emphasized.

In its function as an organ of excretion, the kidneys are supplemented by the skin and mucous membrane. Assuming the normal specific gravity of the urine to be 1020, Tweedy¹ asserts that in health, during free action of the skin, the specific gravity of the urine may ascend to 1030. Normally urea is found among the products eliminated by the skin, and when the skin and mucous membrane are acting vicariously, we find excreted uric acid and its urates, the proteids, dextrose, cystine, and other solids. Their activity may be said, therefore, to alternate with the working of the kidneys.

In this regard the mucous membrane may be fairly considered as the internal skin, possessing as it does the functions of both secretion and excretion; maintaining also, so far as possible, its share of the balance of elimination as a relief to defective kidneys.

Undoubtedly the entire mucous lining of the alimentary canal and respiratory tract assumes the rôle of adjuvant to nephritic activity. Of this whole mucous surface the *locus minoris resistentiæ* may most frequently be found in the nose. I venture to say that no part of the human anatomy is so often the site of minor acute inflammatory affections as is the upper respiratory tract. When of its lining is required the burden of continuous excretion of toxic substances for long periods, the sequelæ are

¹ Tweedy, Medical News, vol. lxviii., No. 7, p. 178.

in order: dilatation of the arterial capillaries, followed by a similar enlargement of the veins; congestion, transudation, an inflammation tending to chronicity and abnormal glandular activity.

The histology of the nose favors such a result. The most important and active physiological structures there in relation to respiration are the turbinated bodies. These occupy much of the space of the nasal chambers. In the classical work of Zuckerkandl,¹ the mucous membrane covering the turbinated bones is described as consisting of an outer layer of connective tissue coated with flat epithelium and a deep periosteal layer; between them lymph structures containing abundant venous plexuses. Penetrating these are lymph and tubular mucous glands, the latter of great length and number, extending from the free to the periosteal surface. McCoy² says these "plexuses of blood-vessels are out of all proportion in number and size to those ordinarily found in mucous membrane." The blood contained is venous blood; the mucous glands are surrounded and bathed by it. When, in addition, that venous blood is charged with toxic material, must it not of a certainty affect the secreting glands, causing first an increased flow of mucus and then an abnormal discharge, laden with inflammatory products and excrementitious matter, and thus eventuate in a chronic nasal catarrh?

Mulford³ has recently stated, rather boldly, I think: "I believe that chronic nasal catarrh has its origin because of a diathesis; that the catarrh is an expression of such a diathesis, and would not assume a chronic course if the diathesis were not present." I am not prepared to indorse so sweeping a claim. I know that chronic nasal catarrh is at times due to a purely local irritation, but I also believe that the irritant is more often not a defective septum, but a defective blood-supply, and that the obstinacy of many cases of catarrh of the upper respiratory tract can be explained by the fact that they are simply the local expression of a constitutional ailment. Imperfect cell-nutrition resulting in perversion of function is a factor in the etiology of chronic catarrh, which I believe warrants careful study.

With less baneful effects the mucous membrane of the pharynx responds to the diathesis; less baneful, probably, because of the difference of the blood-supply. Its appearance is well pictured by Harrison Allen⁴: "The mucous membrane is of a uniform red color, the secretions are abundant, and the tonsils are tumid. Pain is not usually severe, and is referred to the pharynx and not to the muscles at the side. In true lithæmia gouty history is absent." Symptoms in other parts of the body, occasionally associated, are headache, lassitude, flatulence, loss of appetite, malnutrition of the skin, causing dryness, roughness, and itching, irritability of temper or hebetude. These conditions are generally most pronounced in the morn-

¹ Zuckerkandl, Wiener medicinische Wochenschrift, 1884, vol. xxxiv., No. 38.

² McCoy, System of Diseases of Ear, Nose, and Throat, vol. i. p. 566.

³ Mulford, American Medical and Surgical Bulletin, March 7, 1896, p. 313.

⁴ Harrison Allen, Medical News, June 16, 1888.

ing. This is explained by Bishop¹ as due to the blood being most alkaline during the early hours, consequently it then holds in solution a large quantity of uric acid. The alkalinity grows less during the active portion of the day and reaches its minimum at midnight.

These conditions may prevail during any period of adult life; those cases which most impressed me were found in young adults. These subjects may, in later years, become victims of gout or rheumatic gout. In these latter diseases the local evidences are much exaggerated and are well recognized. They have been ably discussed by Harrison Allen, F. Whitehall Hinkel,² and Duckworth. Many cases, however, do not advance beyond the lithæmic stage and give no subsequent history of gout or rheumatism. In any event it is absolutely necessary to make a thorough, general examination, for, as Beverley Robinson³ states, "It is extremely difficult to recognize in the appearance of the pharyngeal or laryngeal inflammation the nature of the diathesis which occasioned them." Much confusion exists in the literature on these subjects, from the careless interchanging of the terms gouty, rheumatic, and lithæmic in referring to diatheses. They are separate constitutional conditions, but the error is probably due to the important part taken by the uric acid group in all their history.

I request that this paper be received, not as a complete consideration of the subject, but as a preliminary study. I have purposely omitted, therefore, the questions of prognosis and treatment, and limited myself to the endeavor to show the possible relationship of the uric acid diathesis to that ailment so trying to patient and physician, catarrh of the upper respiratory tract.

¹ S. S. Bishop, Manual of the United States Hay Fever Association, 1893, p. 25.

² F. W. Hinkel, Transactions American Laryngological Association, 1889, p. 124.

³ Beverley Robinson, New York Medical Record, December 6, 1890.

REVIEW OF MEDICINE.

MEDICINE.

IN CHARGE OF JOHN H. MUSSER, M.D.,

Assistant Professor of Clinical Medicine in the University of Pennsylvania; Visiting Physician to the Presbyterian and Philadelphia Hospitals,

J. A. SCOTT, A.M., M.D.,

AND

JOSEPH SAILER, M.D.,

Physician to the Out-Patient Department of
the Pennsylvania Hospital,

Associate in the Pepper Clinical Laboratory.

Alcoholism in Children. (*Wratsch*, No. 15, 1896.) By M. Goriatchkine.

The author has made a very interesting report on this subject to the Moscow Society of Pædiatrics. He has seen quite a number of cases of ethylism, not only among the poor and working classes, where, unhappily, the example is often set by the father of the family or by the fellow-workers, but also in families belonging to the higher classes.

The author cites, as an example, the history of a little girl of five years, who often partook of cognac, of malaga, and of port wines. This use of spirits began when she was two years of age, on the advice of a physician who was treating her. By little and little the child has become accustomed to this treatment, and actually she takes two small glasses of port and a teaspoonful of cognac each day. The child is anæmic, has restless sleep with nocturnal terrors, and the liver and the spleen are hypertrophied. In other cases the intoxication was more manifest, and showed the ordinary signs of chronic alcoholism.

In order to estimate the frequency of alcoholism in children and the causes which explain it, M. Goriatchkine has questioned the parents of all the children that he has had occasion to see in consultation at Saint Olga's Hospital. In four months he has been able to collect information of one thousand six hundred and seventy-one children (eight hundred and forty-one boys and eight hundred and thirty girls) from one to twelve years of age; of this number five hundred and six children (two hundred and eighty-two boys and two hundred and twenty-four girls),—that is to say, about one-third,—take alcohol, either as a result of their environment or (in half the cases) upon the advice of a physician. This abuse often commences in the first year. The author is convinced that, if there are so many alcoholics among the children, it is in a great degree the fault of physicians who habitually prescribe the various forms of alcohol either to stimulate the

appetite or for other objects. Children thus frequently receive different preparations (vermifuges, diarrhoea remedies, etc.) in alcoholic infusion.

However, in the great majority of cases, alcohol is not indispensable, and ought to be replaced by other substances. In all cases except acute pyrexias, the utility of alcohol is far from demonstrated. In prescribing alcohol, the habit may be formed, the need of an excitant may be felt, and in predisposed children, the issue of alcoholic parents, the alcoholic diathesis created by the alcoholism of the parents and remaining until that time in a latent state may often be awakened.

The only cases in which alcohol should be given, according to M. Goriatchkine, are those of the acute diseases with heart-failure; but even here alcohol should not be prescribed hastily, but should be put off as long as possible, and employed only as a last resort. When the cardiac activity has returned to the normal the remedy should be discontinued.

The administration of alcohol in chronic troubles of nutrition, to "give strength" to the child, appears to be not only useless but even dangerous, on account of the need which it creates. On the other hand, there is no known authentic case in which alcohol shall have rendered real service. The fact that for the past six years alcohol has been used only in cases of extreme urgency at Saint Olga's Hospital (Moscow) is a proof of the manner in which one may omit it in medicine. The results have been far from less beneficial than formerly.

Therefore, the author advises strongly, in accord with Strümpell and Smith, to avoid prescribing alcohol as much as possible, and to oppose the parents with all one's power if they try to make children take it under whatever pretext.—*Gazette des Hôpitaux*, August 11, 1896.

Concerning the Occurrence of Thyreoidine in the Human Body. (*Wiener klinische Wochenschrift*, July 16, 1896.) By Jul. Schnitzler, M.D., and Karl Ewald, M.D.

A number of pituitary bodies, weighing altogether nine grammes, were collected in the pathological department and carefully analyzed for the presence of iodine, which was found to be present in noticeable quantities. As this result was directly contrary to that of Professor E. Baumann, a second investigation was made upon a collection weighing altogether twenty-four grammes, with similar results, and the authors conclude that the determination of the presence of iodine in the pituitary body is an advance in our knowledge of the vicarious action of this gland for the thyroid. Ewald alone made some analyses to determine the presence of iodine in the thyroid gland in various morbid conditions. In four cases of thyroid carcinoma relatively considerable iodine was present, and it was also found in the metastatic masses. In a tumor of which a large portion had undergone hyaline degeneration, no iodine was found in the degenerated mass, and but traces in the surrounding tissue, and Ewald concludes that colloid degeneration may make the gland to a certain degree incapable of perform-

ing its function. In a gland with advanced colloid degeneration and a greatly diminished parenchyma only slight traces of iodine were present. In a similar case, in which, however, the parenchyma was well preserved, a very marked iodine reaction occurred. In a third case that showed advanced parenchymatous degeneration no iodine was present. [It seems indicated by these investigations that the presence of iodine is associated in some way with the functional activity of the parenchyma, and the fact that the carcinoma cells appear to be able also to secrete it, perhaps explains the rarity of myxœdematous symptoms in this condition.]

A Contribution to the Casuistry of Treatment with Carcinoma-Serum. (*Wiener klinische Wochenschrift*, July 16, 1896.) By Josef Sartschneider, M.D.

Six cases in all were treated by the serum of Scholl and Emmerich. Of these three were carcinoma of the breast, all of which showed progressive increase of the primary tumor and its metastases ending in death; one was a case of epithelioma of the lips, in which all the symptoms grew worse, but the final result was not determined, one was sarcoma of the leg, death occurring shortly after admission, and the sixth a lympho-sarcoma of the neck. In the latter alone there was a notable reduction in the size of the growth and improvement in all the symptoms, but the patient unfortunately passed from observation. The injections were very painful in nearly every instance, and, in a case of mammary scirrhus, exceedingly difficult. Following the treatment there was usually febrile reaction, and the site of the injection continued painful for some hours. Often the patient complained of nervousness and irritability for about twenty-four hours. The local changes were softening of the tumor and the development of an area of redness for some distance in the surrounding skin, in which the vessels appeared distinctly injected. In time this region became œdematous, but in no case was pus found upon incision. Sartschneider concludes that, although the serum has a pronounced effect upon carcinoma, it is very doubtful if this effect is of a curative nature, as in every case not only did the primary tumor increase in size, but the metastases became rapidly more widely extended, especially in the reddened and œdematous skin around the site of the injection, and the reaction by its severity often caused a state of dangerous depression. In regard to lympho-sarcoma, the results are possibly more favorable, although it is hardly possible to draw conclusions from a single case, particularly as the observation was not complete.

A Case of Pulmonary Tuberculosis treated by Serotherapy. (*Comptes Rendus de la Société de Biologie*, July 3, 1896.) By Dr. de la Jarrige.

The patient, a girl of twenty-one, had enjoyed excellent health until she reached the age of seventeen, when she began to suffer from a dry

cough, and a tubercular infiltration of the left apex was recognized. The symptoms grew progressively worse until at the time of commencing the treatment there were the signs of numerous cavities in the left lung and a tubercular laryngitis. Massive intrapulmonary injections were practised, with the result of greatly diminishing the catarrhal symptoms, but, as these subsequently reappeared and the condition of the patient became desperate, it was decided to employ subcutaneous injections of the antitubercular serum of Richet and Héricourt. The first and second injections were without effect, but the third was followed by an intense urticaria, accompanied by severe headache and delirium, the temperature reached 40° C. (104° F.), and there was profound prostration. Death was expected, but improvement took place and continued until the patient was at least as well as before the injection. After a second series of injections another reaction occurred, less violent in character, and improvement continued until the health of the patient was completely restored, although there were still signs of a dry cavity in the left lung. Jarrige concludes that we are now in a position to combat tuberculosis successfully by the employment of intrapulmonary injections, antitubercular serum, and forced feeding. The serum used was obtained from a dog immunized by avian tuberculosis.

The Effect of Ligature of the Lymphatics of the Liver upon the Anticoagulant Action of Propeptone. (*Comptes Rendus hebdomadaire de la Société de Biologie*, July 3, 1896.) By E. Gley, M.D.

Although certain experiments that the author had made in collaboration with Pachon had demonstrated that the operation of ligating the lymphatics apparently prevented the coagulating action of propeptone upon the blood, certain doubts that had been expressed concerning the accuracy of their observation induced them to repeat the experiments upon a series of twelve dogs; in six of these the technique was successful and the result invariably as before, the clot forming promptly after the injection of the propeptone. As a possible explanation of this phenomenon Gley suggests that the intraparenchymatous pressure in the hepatic cell is greatly increased by the congestion of the lymph, and that, in consequence, the cell itself resists more or less than in the normal condition.

THERAPEUTICS.

IN CHARGE OF ALEXANDER D. BLACKADER, B.A., M.D.,
Professor of Therapeutics, McGill University, Montreal, Canada,

ASSISTED BY

D. J. EVANS, M.D.

Anticholeraic Inoculations at Calcutta. (*Indian Medico-Chirurgical Review*, July, 1896.)

Dr. Simpson, the health officer of Calcutta, presents a very complete report of the results of the anticholeraic inoculations performed in Calcutta during the past two years.

The number of people inoculated during this period was seven thousand six hundred and ninety; of these five thousand eight hundred and fifty-three are Hindoos, one thousand four hundred and seventy-six Mohammedans, and three hundred and sixty-one other classes. A careful system of registration of data regarding each person inoculated is used, so that investigations concerning the effect of the inoculations can be readily made. These investigations are confined exclusively to those houses in which cholera has actually occurred, the object being to ascertain and compare the incidence of cholera on the inoculated and uninoculated in those houses in which inoculations have been previously carried out. For this purpose infected houses in which inoculations have not been performed and inoculated houses in which cholera has not appeared are excluded, as they do not furnish a reliable basis for comparison. The accuracy of these observations has been confirmed by special investigation on two occasions, one in July, 1895, when M. Haffkine revisited ten of the thirty-six houses in which inoculations had then been made, and the other quite recently, when Surgeon-Captain Robson Scott, J.M.S., deputy sanitary commissioner of the Presidency Circle, spent several weeks in testing the accuracy of the recorded observations.

The data collected have been grouped under three periods, and show the following results: 1. In the houses where cholera occurred during the first four days after the inoculation—a period in which the protective influence of the vaccine is gradually asserting itself—there were one hundred and sixty-seven uninoculated individuals, who had six deaths (3.59 per cent.) and three attacks ending in recovery, and two hundred and fifty-nine inoculated persons, who had five deaths (1.93 per cent.) and one attack with recovery. 2. In the houses where cholera occurred during the year following the first four days after the inoculation and in which there was almost absolute freedom from the disease among the inoculated, there lived five hundred and two non-inoculated, who had forty-two deaths (8.37 per cent.) and five attacks ending in recovery, and two hundred and sixty-nine inoculated who had one death (0.37 per cent.). 3. In the houses where the disease appeared more than one year after inoculation, where there was a gradual disappear-

ance of resistance against the disease, there were two hundred and thirty-eight uninoculated, who had twenty-three deaths (9.66 per cent.) and three attacks with recovery, and ninety-six inoculated who had six deaths (6.5 per cent.). Taken collectively, among six hundred and fifty-four uninoculated persons there were seventy-one deaths, while among the four hundred and two inoculated individuals in the same households there were twelve deaths, a reduction of mortality of 72.47 per cent.

The results in Calcutta are fully confirmed by reports from other parts of India, which are also given in detail in this article.

This evidence of the protective nature of these inoculations incites the writer to urge upon the commissioners the importance of adding to their defensive weapons against cholera the powerful one of inoculation.

Therapeutics, New and Old. (*Medico-Chirurgical Journal*, July, 1896.) By William Carter, M.D.

By old therapeutics the writer does not mean those of a period when our national pharmacopœias were encumbered with such so-called "remedies" as "secundina humana," etc. He refers to the century or century and a half immediately antecedent to our own time, when a new spirit had grown up and originated a new method for establishing the utility of drugs. Physicians then began to try drugs on those who were diseased, and admitted or rejected them accordingly as they stood the test. The trial of the merits of a new remedy was generally one of years, and when its final recognition came there was not a medical man in the kingdom who did not feel that he was justified in confidently relying upon its efficacy. Nearly all of the great practical remedies of that time remain to this day as highly valued as they were nearly a century ago. The practical sagacity of keenly observant men, who watched the effects of agents on patients actually suffering from various diseases, was not likely to be deceived in the final judgment of their utility.

Was this old method a sound one? Did it deserve the appellation "scientific," or should it be despised and discarded as empirical, in the modern and unworthy sense of that term? In order to deal fairly with the question it must be remembered that more precision was given to this system of applied therapeutics by using it in connection with a broad but approximately accurate classification of human beings into distinct physiological groups. Men were classed as nervous, sanguineous, lymphatic, bilious, etc., and what would suit the lively, hopeful patient was believed unsuitable for the lymphatic or bilious one. These systems were correlatives of each other; for it had not then occurred to men of science that it would be much nearer the truth to discard all of the finer sensibilities of the spirit—if, indeed, the refined modern experimenter is willing to admit that there can be anything worthy of that name outside of what can be seen by his microscope, or that cannot be weighed in balances to which $\frac{1}{1000}$ gramme is a heavy weight, or that cannot be penetrated and made visible by electrical

rays—and to consider all living tissues in their relation to medicines in terms of so many grammes of guinea-pig, dog, or rabbit on which they had been experimentally made to act in the pharmacological laboratory.

Even the vast changes in practice which have taken place within the past one hundred or one hundred and fifty years are due to the cautious but fearless spirit of independent observation. If we consider for a moment the disuse of venesection we shall be convinced of this. Almost all the so-called scientific demonstrations of the reasons why indiscriminate venesection *ought* to be bad have been given to us long since the time when, the independent spirit of observation of our predecessors having proved it to *be* bad, it was omitted from practice.

Perhaps nothing has served so strikingly to manifest the contrast between the old and new methods of laying a foundation for therapeutics as the discussions recently carried on in the *British Medical Journal*, and of all the papers that of Professor Cash may be taken as best exemplifying the spirit of the new one. In it he says that "it is neither conducive to the accuracy of pharmacological research, nor yet of treatment, that we should work with bodies whose constitution is not understood, and which may contain principles divergent or even antagonistic in their action."

Is it then so unscientific as Dr. Cash's statement would imply to use bodies whose constitution is not understood, and to associate together in the same prescription drugs which are physiologically antagonistic to each other?

Let those practical therapeutists give the answer who know the uses of opium, of digitalis, of jaborandi, and of their advantages in hundreds of cases over morphine, digitaline, pilocarpine, etc.

Then, as to accuracy of treatment, and impossibility of attaining to it unless the constitution of the bodies with which we work is completely understood, did it detract from the accuracy of treatment of myriads of malarial-stricken patients that they should have been completely cured by the employment of cinchona bark before the composition of that wonderful drug was made known? Ipecacuanha cured dysentery quite as well before its alkaloid (emetine) was discovered as ever it has since.

The therapeutics of a hundred years ago were at least practical, but we have learned much in our time. We have learned or are learning the great potency and how precisely to control the influence of animal ferments in their maintenance of a healthy balance between the various tissues; we have learned or are learning how, by means of antitoxins, some of the most malignant of the infectious diseases can be brought under control by the application of principles akin to those which were first applied by that noblest of noble Englishmen, the anniversary of whose great discovery we celebrate this year; we have learned or are learning the great influence of antiseptics on disease.

The future is full of promise. For all the great work that lies before us, a wise combination of sagacious and patient observation of disease and

the remedies which influence it, on the one hand, and of cautiously-conducted laboratory experiments, on the other, is essential. Neither method can afford to despise the other; but each in a spirit of humble and reverential desire for truth concerning this great mystery of human life in all its manifold phases should go hand in hand with the other, each assisting the other in its great aim of elucidating the mysteries of disease, and of relieving human suffering.

The Therapeutic Value of the mixed Toxins of the Streptococcus of Erysipelas and Bacillus Prodigiosus in the Treatment of Inoperable Malignant Tumors. (*American Journal of the Medical Sciences*, September, 1896.) By William B. Coley, M.D.

In this interesting article the writer discusses the different methods that he used in the preparation of the toxins of the erysipelas streptococcus and the bacillus prodigiosus; the mode of their administration, and their therapeutic value in the treatment of tumors.

In the method finally determined upon as of the greatest value in the preparation of these toxins, the two germs are inoculated together into the same broth, the erysipelas streptococcus being first grown alone for ten days, the prodigiosus bacillus then added, and the two allowed to grow together for ten days. The cultures are sterilized by keeping them at a temperature of 58° to 60° C. for one hour, and are then used without filtration.

Cultures recently obtained from fatal cases of erysipelas were found to give the most virulent toxins. Mr. Burton, director of the Loomis Laboratory, from whom the writer received much assistance, prepares these mixed toxins powerful enough to produce very severe constitutional symptoms with a prolonged chill and a temperature of 104½° in doses of one-half a minim (0.066 cubic centimetre).

An important point to remember in regard to dosage is that much larger quantities can be borne when injected subcutaneously than when injected into a vascular tumor where absorption is much more rapid. One minim of a filtrate or one-half a minim of the unfiltered toxins is the initial dose, and this is gradually increased each day until the reaction-temperature reaches 103° to 104° F. Very little benefit has been noted in cases in which no reaction was obtained. Daily injections aiming to get two or three well-marked reactions during a week are continued for two or three weeks, and then discontinued if no decided improvement has taken place. In some of the successful cases, however, the treatment has been kept up for three or four months, occasional intervals of a few days rest having been allowed.

A report of one hundred and sixty cases gives many striking instances of improvement and of disappearance of these tumors. The writer says, "This series of upward of twenty cases of inoperable sarcoma, four of which have remained well for more than two and a half years, the diagno-

sis in all of which has been established beyond question, according to the accepted methods of diagnosis, I believe to be sufficient to demonstrate that a real and positive step forward has been made in a field that, up to the present, has resisted every attempted advance of medical science."

Conclusions: 1. The mixed toxins of erysipelas and bacillus prodigiosus exercise an antagonistic and specific influence upon malignant tumors, which influence in a certain proportion of cases may be curative. 2. This influence is slight in most cases of carcinoma (including epithelioma); most marked in sarcoma, but varies with the different types, the spindle-celled form showing by far the greatest influence. 3. The action of the toxins is not merely local in character, but systemic. 4. The toxins should be used only in clearly inoperable cases, or after primary operation to prevent recurrence. 5. The results will vary greatly with the strength of the preparation, the most virulent cultures giving the best results.

The Influence of Acute Alcoholism on the Normal Vital Resistance of Rabbits to Infection. (*The Journal of Experimental Medicine*, vol. i., No. 3, 1896.) By A. C. Abbott, M.D.

The question of the effect of alcohol when used as a beverage, which is now being investigated by the committee of fifty, is in this article confined to its influence upon the normal vital resistance of animals exposed to various forms of infection. The pyogenic cocci, i.e., the *streptococcus pyogenes* and the *staphylococcus pyogenes aureus*, and the *bacillus coli communis*, have been thus far the infectious organisms with which the experiments have been conducted. Cultures of these germs were inoculated into groups of alcoholized and non-alcoholized animals, so that, by a comparison of results, the difference could reasonably be referred to a reduction of vital resistance brought about by the alcohol administered.

The alcoholized rabbits were kept daily in a state of intoxication. The dose necessary to positively produce intoxication ranged from five cubic centimetres to fifteen cubic centimetres of pure ethyl alcohol.

From the results of these experiments the author concludes: That the normal vital resistance of rabbits to infection by *streptococcus pyogenes* is markedly diminished through the influence of alcohol when given daily to the stage of acute intoxication. That a similar, though by no means so conspicuous, diminution of resistance to infection and intoxication by the *bacillus coli communis* also occurs in rabbits subjected to the same influences. And that, while among the alcoholized rabbits inoculated in various ways with *staphylococcus pyogenes aureus*, individual instances of lowered resistance are observed, still it is impossible to say from these experiments that in general a marked difference is noticed between alcoholized and non-alcoholized animals as regards infection by this particular organism. It is interesting to note that the results of inoculation of alcoholized rabbits with the erysipelas coccus correspond in a way with clinical observation on human

beings addicted to the excessive use of alcohol when infected by this organism.

Throughout these experiments, with few exceptions, it will be seen that the alcoholized animals not only showed the effects of the inoculations earlier than did the non-alcoholized rabbits, but in the case of the streptococcus inoculations the lesions produced (formation of miliary abscesses) were much more pronounced than are those that usually follow inoculation with this organism.

Gelanthum. (*Therapeutische Wochenschrift*, September 13, 1896.) By P. G. Unna, M.D.

After two years' experience with this vehicle the writer recommends it very strongly for use in the various skin-diseases.

The great difficulty with the soluble varnishes used heretofore has been that insoluble substances like zinc oxide, sulphur, and chrysarobin cannot be evenly suspended in them, but collect in lumps or fall to the bottom, but in gelanthum they are evenly divided and remain suspended. Hygroscopic substances like ichthyol easily form a dry coating in this vehicle, and large quantities of the necessary medicaments can be added, as of ichthyol thirty per cent., of salicylic acid, resorcin, and pyrogallol four per cent., and of carbolic acid five per cent., without destroying its varnish-like properties. Two incompatible bodies, such as salicylic acid and zinc oxide, which in watery solutions undergo chemical reaction, can be used together in gelanthum. Fats can be mixed with it to the amount of ten per cent., and glycerin twenty per cent., to prevent its drying too quickly.

Gelanthum—named from its principal constituents—consists of equal parts of gelatin and tragacanth. Each substance is macerated slowly in cold water, then subjected to steam and filtered. By this means the gelatin is deprived of a part of its gelatinous property. The two substances are then mixed and subjected to steam for two days, and then pressed through gauze. Glycerin five per cent., some rose-water, and two per cent. of thymol are added. The medicament to be added, if not soluble in water, must be rubbed into a soft paste with water, and fats must first be emulsified by gums and water.

As compared with the old soluble varnishes it presents the following advantages: it spreads easier, dries more quickly, and with a smoother surface; it holds the solid substances evenly suspended and finely divided upon the skin; it tolerates all substances singly and together; hygroscopic substances are made to dry; it bears an addition of fat to prevent drying too quickly. It is a cheap vehicle.

Maragliano's Antitoxin-Serum; Treatment of Pulmonary Consumption.—The *New York Medical Journal*, of August 15, 1896, in an editorial, reviews an article on the serum treatment of pulmonary tuberculosis, by Dr. Zaeslein, of Genoa. The writer thinks that the use of the

serum prepared by Maragliano has passed the experimental stage, and may safely be received into practical therapeutics, for the dose, in antitoxic units, is adjustable and calculated for long periods and the use of the remedy rests on adequate clinical observation.

Maragliano inoculates the animals from which the serum is to be obtained—dogs, asses, and horses are employed—with a mixture of filtrates from cultures that have been heated and from those that have not been heated. The heated cultures are prepared by steaming highly virulent cultures at a temperature of 212° F. for three or four days, and then treating them in the same way as for producing Koch's tuberculin. The unheated cultures are filtered through a Chamberland filter, and then placed in a vacuum with the temperature never above 86° F. The first product contains all the toxic elements that resist heat,—*i.e.*, the bacterial proteins or tuberculins; in the second there are the toxalbumins, which do not bear heat, and tuberculins also. To establish an unchanging toxic unit each filtrate is concentrated to such a degree that a cubic centimetre will contain a hundred toxic units,—*i.e.*, a cubic centimetre for each fifteen hundred grains of the guinea-pig's weight will be required to kill an animal. Three parts of the heated and one part of the unheated filtrate are used for each inoculation, the operator beginning with two milligrammes for each kilogramme of the animal's weight, and increasing the dose one milligramme daily until it reaches from forty to fifty milligrammes. The inoculations are usually continued for six months. Three or four weeks after the last inoculation blood is drawn from the animal and the serum is separated and treated according to the ordinary method.

The effects of the treatment on the manifestations of the disease are: diminution and final disappearance of the râles from drying up of the deposits. The areas of dulness diminish or disappear. Slight fever usually disappears; high fever may abate and even subside entirely. There is gain in weight even if the fever continues. The tubercle bacilli in the sputa become reduced in number and finally disappear entirely. After further treatment the appetite improves, the patient sleeps well and can exercise without fatigue.

Maragliano's statistics relate to four hundred and forty-five cases which are divided into six groups. A summary of the results obtained from the treatment shows that the fever disappeared in one hundred and seventy-six out of three hundred and twenty-two cases,—in fifty-five per cent. of cases of broncho-pneumonia with "microbian associations;" in thirty-two per cent. of those of cavities; in forty-eight per cent. of those of diffuse broncho-pneumonia; and in eighty-six per cent. of those of circumscribed broncho-pneumonia. The local signs disappeared in twenty-seven per cent., were improved in forty-one per cent., were unchanged in thirty per cent., and were aggravated in six per cent. There was an increase of weight in fifty-seven per cent. The tubercle bacilli disappeared in forty-three and two-tenths per cent.

The serum was administered subcutaneously every other day and the temperature carefully observed. When a rise occurred, the treatment was suspended until it fell. When this treatment failed to affect patients who had high fever, from five to ten cubic centimetres of the serum were given every fifth day.

The use of the serum should be continued until a cure results, then two injections a week should be given for two months, and after that one injection a week for a year. The side of the chest and back are the preferable parts of the injection.

[At the late French Medical Congress the question of the value of the serum diagnosis of typhoid fever was discussed. M. Achard has obtained the characteristic reaction with the milk and blood of a typhoid patient. M. Widal has observed agglutination of the bacilli by the serous fluid removed from a blister of a typhoid patient with lung complications. He also obtained characteristic results with the serum of two persons who had had severe attacks of typhoid fever three and five years previously.—*British Medical Journal*, August 29, 1896.]

NEUROLOGY.

IN CHARGE OF LANDON CARTER GRAY, M.D.,
New York City,

GUY HINSDALE, M.D.,
Philadelphia,

WILLIAM BROADDUS PRITCHARD, M.D., AND
New York City,

WM. G. SPILLER, M.D.,
Philadelphia.

Hysterical Trophic Lesions of the Teeth. (Report of the Third French Congress for Internal Medicine; *Semaine Médicale*, August 9, 1896.) By Dr. Sollier.

Erosion of the enamel of the teeth with exposure and destruction of the dentine was observed in two patients who had had hysterical anorexia with vomiting. The exposed nerves were very painful. The roots were not involved for a long time. The lesions were believed to be due to hysteria.

The Family Form of Spastic Paraplegia. (Report of the French Congress of Alienists and Neurologists; *Semaine Médicale*, August 8, 1896.) By Drs. Raymond and Souques.

The spastic paralysis began in one sister at the age of nine years in the right lower limb, and later involved the left as well as the trunk and upper extremities. The contractures are now extreme in the lower limbs. In the trunk and arms the movements though possible are stiff.

In the other sister the spastic paralysis began, at the age of twelve, in the left lower extremity and extended to the right. The trunk and arms are not yet involved.

In both the patella reflex is exaggerated. There is only one autopsy on record of this form of disease, and that was reported by Strümpell. In his case there was combined sclerosis involving the pyramidal tracts, the columns of Goll, and the direct cerebellar tracts.

Dr. Etienne, in the same congress, reported a case of facial monoplegia with conjugate deviation of the head and eyes. At the autopsy the anterior part of the internal capsule was found destroyed by a hemorrhage.

Paralysis and Muscular Atrophy following Injection of the Sterilized Culture of the Pneumococcus. (*Comptes Rendus des Séances de la Société de Biologie*, July 25, 1896.) By Paul Remlinger, M.D.

Symmetrical atrophy of the anterior limbs began to develop in a rabbit twelve to fifteen days after the injection of a sterilized culture of the pneumococcus.

Eight days later the atrophy was intense. During this time fever, loss of appetite, and torpor were noticed. Myelitis was probably the cause, although the diagnosis was not confirmed by autopsy, as the animal still lives.

An Acute Case of Total External Ophthalmoplegia and Laryngeal Paralysis, resulting from Peripheral Neuritis in the Early Stages of Tabes. (*Comptes Rendus des Séances de la Société de Biologie*, July 25, 1896.) By Drs. Dejerine and Petreen.

Complete external ophthalmoplegia on the right side, and nearly complete on the left, developed in the preataxic period of tabes. The pupils responded slowly and imperfectly to accommodation and light. On account of paresis of the dilators of the glottis the patient was in a permanent state of dyspnoea, and died from suffocation.

At the autopsy the diagnosis of tabes was confirmed. The third, sixth, tenth, and eleventh nerves of both sides were much atrophied, and presented the lesions of acute parenchymatous neuritis in the extramedullary portion only of the nerves. The explanation for this is not readily found. The nerve cells were intact (the method of Nissl could not be employed).

The case is interesting on account of the rapid course of the external ophthalmoplegia and laryngeal paralysis in a case of tabes, as usually the development is slower; and also on account of neuritis as the cause of these affections.

Scleroderma. (*Journal of Nervous and Mental Disease*, July, 1896.) By F. X. Dercum, M.D.

In diffuse scleroderma two or even three stages may be distinguished, this is probably also true for the circumscribed and more purely localized forms. In the diffuse variety a condition is early noted in which the substance of the derma, and it may be of other structures, is increased in both volume and density. According to the physical qualities of this

enlargement the cases may be separated into the indurated and the oedematous forms. A third variety may be recognized in which the volume of the skin is not so much affected as its density and resistance. Three cases of this uncommon disease are reported.

The first case was a patient who received a severe transverse lacerated wound over the occiput, and the disease is to be attributed to the nervous shock produced in this way. The wound healed rapidly and there was nothing to suggest an infectious origin. Persistent asthenia and mental depression were noted. Some months after the accident considerable swelling was observed over the shoulders and arms, and to a less extent over the forearms, chest, abdomen, and back. There had been persistent headache. The patient first noticed that the skin on the back of the neck and about the scar was stiff and hard. This stiffness gradually extended to the face, shoulders, arms, and trunk. There were no sensory disturbances. The knee-jerks were plus. An examination of the blood showed an excess of leucocytes, especially of the mononuclear. Peptone, or albumose, was found in the blood but not in the urine. Pigmentation of the skin was noted later in the process. The patient perspired freely, the extremities were often cold, and he was very irritable.

The disease in the second case began in swelling of the hands, and black specks appeared on the finger-tips, later the fingers became very sensitive. The feet and ankles were observed to be swollen in the morning. The patient was very weak. Pain was experienced especially in the elbows, wrists, and knees, and a sense of stiffness was felt in the neck. When examined by Dr. Dercum, more than a year after the beginning of the disease, the patient was much emaciated, owing to the disappearance of the superficial fat, the tissues of the face were slightly resistant to the finger, pigmentation of the skin of the abdomen and trunk was observed. Over the back of the hands, fingers, and thumbs the skin was rigid and glossy and was thickened over the phalangeal joints. About the ankles also the skin was resistant. Passive and voluntary movements at the wrist, metacarpal and phalangeal joints were impaired. The patient was very neurasthenic. Above the left knee a swelling was observed which varied from time to time as did also the infiltration of the hands. Röntgenographs failed to show the clear spaces in the second and third phalangeal joints normally present, and in one picture at least a shadow could be traced at the ends of the bones as though the transparent cartilage had been made opaque by the deposit of some substance not permeable to the Röntgen ray. The general condition of the patient improved under treatment. It is probable that structures other than the skin were involved in this case, for in parts where the skin was pliable movement was impaired. Ulceration at the base of the occiput and over the phalangeal joints, and ridging of the nails must be mentioned.

In the third case also the disease began by swelling of the fingers. The skin is at present tightly drawn over the forehead and nose, and there

is a decided sclerodactyle of both hands. Ankylosis is observed in the phalangeal joints.

Dr. Dercum discusses the trophic changes seen in the disease and the pathological findings. He believes that primarily the connective tissue is infiltrated, swollen or enlarged, and that there is a certain analogy between this disease and myxœdema.

The Origin of the Tabetic Amyotrophy. (*Revue neurologique*, No. 4, 1896.) By C. Schaffer, M.D.

While some (Dejerine) consider the tabetic amyotrophies as due to lesions of peripheral nerves, others (Charcot, Pierret, Leyden, and Condoléon) believe them to be of central origin. Schaffer has examined by the method of Nissl the spinal cord from a case of advanced tabes with arthropathy of the knee. The anterior horns of the cervical cord contained normal nerve cells of the stichochromic type. The cells of the lumbar cord were very different, only a few were normal. In some the chromatic substance appeared as very small granules, in others disintegration was seen near the periphery, and the perinuclear portion was diffusely and intensely stained; under high power this was found to be due to the presence of many minute granules of chromatin in the achromatic substance. The chromatic substance of the processes was normal in most cases even when the cell body was much altered. Schaffer states that in tabetic amyotrophy—perhaps in every case—there is a peripheral neuritis, but this does not exclude a central affection, and does not mean that the peripheral alterations are independent of the affection of the anterior motor cells. The tabetic amyotrophy may have its origin in the primary affection of the nerve cells of the anterior horns. The altered trophic function of the cell is shown first at the most peripheral part of the nerve fibre and the intervening portion of the nerve may be intact. In tabes the changes in the ganglion-cells are of slow formation. Destruction of the reflex collaterals from the posterior roots cuts off much of the normal excitation of the anterior cells and structural changes take place.

Secondary Degeneration, especially of Gowers's Tract, with some Observations on the Reflexes, in Compression of the Spinal Cord. (*Archiv für Psychiatrie*, xxviii. p. 510.) By A. Hoche, M.D.

The following are the most important results obtained from an examination of the spinal cord by the method of Marchi, from a case of compression by an accumulation of pus:

The comma zones of the posterior columns were degenerated for an unusually long distance: from the seventh thoracic to the third lumbar segment, but, contrary to the opinion of Gombault and Philippe, they were not found to have any connection with the oval field of Flechsig in the lumbar cord. The degenerated fibres belonging to the oval field of the lumbar region between the seventh thoracic (the seat of compression) and the first

lumbar segment were found at the posterior periphery of the cord, and it was observed that in the higher regions they approached the posterior horns without leaving the periphery. The origin of these fibres is unknown.

Degenerated fibres were seen to pass from the columns of Goll into the restiform bodies by means of the posterior external arciform fibres; such fibres were also observed to pass to the direct cerebellar tracts, and a few into the decussation of the fillet.

In this case, for the first time in man (Hoche), the tract of Gowers has been traced to its termination. In the upper part of the pons the tract bends upon itself so that a section at this level contains two separate portions of the fibres. Degenerated fibres were found in the roof of the fourth ventricle, partly in the velum medullare anticum, partly in and near the anterior cerebellar peduncles. The termination of this tract is in the vermis. It seems that only those fibres which enter Gowers's tract from the upper and middle third of the spinal cord terminate in the cerebellum, while those from lower regions probably do not extend beyond the cervical cord.

The reflex arc in the lumbar cord was intact, yet notwithstanding the descending degeneration of the lateral pyramidal tracts, and the location of the area of compression seven segments above this arc, the patella reflex was absent during life. Likewise in a second case reported by Hoche, of compression from luxation of the seventh cervical vertebra, the patella reflex was absent. This is in accordance with the statements of Bastian.

In both cases, one of compression at the seventh thoracic, the other at the eighth cervical segment, the degeneration in the posterior columns below the lesion extended in the thoracic region along the periphery, in the lumbar region it occupied the oval field of Flechsig, in the sacral cord it formed the triangular area of Gombault and Philippe, and extended to the filum terminale.

Hoche believes that in the antero-lateral columns the longer the associative fibres are the more peripherally are they situated.

A Case of Tumor of the Cerebellum in which Operation was Rejected. (*American Journal of the Medical Sciences*, September, 1896.)
By James Hendric Lloyd, A.M., M.D.

The patient reported by Dr. Lloyd had been struck on the occiput seven years ago, and since that time had had violent headaches. Five weeks before admission into the hospital he began to have severe shooting pain, situated, like the headaches, in the occipital region. Vision began to fail. Vertigo, without vomiting, except once, was complained of. On examination, in February, 1896, he was seen to have a characteristic cerebellar gait and attitude. His head and trunk were forced to the right side even when he attempted to sit up in bed; this position was very noticeable in walking. He was almost completely blind, and had dilated pupils. His speech was hesitating and cerebration was slow. The knee-jerks were ex-

aggerated and slight ankle clonus was observed. There was no anæsthesia and no paralysis of arms or legs. In the horizontal position control of the lower limbs was good. The muscles supplied by the fifth, sixth, seventh, ninth, and twelfth nerves were not paralyzed. There was no involvement of bladder or rectum. Choked disk in each eye was reported by Dr. Oliver. With the exception of slight response of the left iris to very strong light stimulus there was no reaction to light, accommodation, and convergence.

About two months after admission incontinence of urine was observed.

The diagnosis was made of tumor in or near one of the middle cerebellar peduncles. Largely on account of a deformity of the skull due to an injury, operation was decided upon, but a change in the patient's symptoms rendered this impracticable.

At the autopsy an oblong gliosarcoma, five and a half centimetres by two and a half centimetres, was found on the under surface of the cerebellum between the pons and medulla on one side and the right lobe of the cerebellum on the other. The fourth ventricle was entirely free. The tumor sprang entirely from the under and external surface of the middle cerebellar peduncle. The location of the tumor explained the high grade of optic neuritis. No satisfactory explanation was obtained from the autopsy for the ophthalmoplegia interna without ophthalmoplegia externa. It is remarkable that none of the cranial nerves, except the eighth,—as far as the patient's condition permitted tests to be applied,—were injured by the tumor. In this case the forced movement was towards the side of the lesion.

Loss of Consciousness in Hysterical Attacks. (*Revue Neurologique*, September 15, 1896.) By A. Pitres, M.D.

Dr. Pitres discusses the subject of the preservation of consciousness and memory in hysterical convulsions. There are, according to him, three periods in a complete hysterical attack.

1. The pre-convulsive period, in which the aura, mental, sensory, or ovarian, occurs.

2. The convulsive period, consisting of the tonic and the clonic spasms.

3. The post-convulsive period, of which the most striking feature is the delirium identical with the mental state which characterizes one or the other of the different varieties of hypnosis.

In the first period consciousness and memory are always preserved, and injury which might occur during the second period may be prevented by precautionary measures. Preservation of memory explains the ability of the patient to tell the hour at which the attack began.

In the second period consciousness and memory are usually abolished, and the patient has no knowledge of the convulsions.

In the third period consciousness is usually preserved. The patient replies to questions put to him, except in those cases in which he falls into

a profound lethargy or into an acute maniacal delirium. He has knowledge of his movements, and yet when the attack is terminated he is ignorant of what he has said and done during this third stage. If he is placed in a hypnotic state he is able to recall the words uttered in the post-convulsive period.

Any one of the three periods may exist alone.

Occasionally, when the second period constitutes the entire attack, the patient may be able to reply to questions, but he has no knowledge of his convulsive movements, and states during severe convulsion that he is in perfect repose.

In rare cases, when the post-convulsive period constitutes the entire attack, consciousness may be partially or totally abolished, and memory may be lost not only in the normal state succeeding, but also in the hypnotic.

OBSTETRICS AND GYNÆCOLOGY.

IN CHARGE OF RICHARD C. NORRIS, M.D.,

Lecturer on Clinical and Operative Obstetrics in the University of Pennsylvania; Obstetrician-in-Charge, Preston Retreat; Visiting Obstetrician, Philadelphia Hospital; Gynæcologist, Methodist Episcopal Hospital; Consulting Obstetrician and Attending Gynæcologist, South-eastern Dispensary and Hospital for Women and Children,

AND

LAWRENCE S. SMITH, A.B., M.D.,

Instructor in Clinical Gynæcology in the University of Pennsylvania.

A Contribution in Regard to the Reflex Action of Operative Traumatism upon Circulation and Respiration. (*Centralblatt für Gynäkologie*, 1896, No. 19.) By Wilh. Rühl, M.D.

The author reports two cases of post-operative shock following celiotomies in support of the theory that many cases of intense shock and subsequent death, which cannot be attributed to any tangible cause, are due to reflex action on the heart and respiratory centre produced by the irritation of the peripheral nerves. The anæsthetic lessens the intensity of these reflexes, and it is only on return to consciousness that the patient's condition becomes grave. In the case of the first patient the operation, a myomec-tomy, lasted only forty-five minutes, and at its conclusion the condition of the patient was most satisfactory. One hour later she was in a state of profound shock with failure of heart and respiration. All means of stimulation were tried without effect, and the situation was becoming most serious until an injection of a full dose of morphine was tried. The result was most surprising: in a few minutes the pulse became perceptible again and slowly regained its normal strength and rhythm. A relapse, four hours later, required another dose of morphine, but after that the recovery was uninterrupted.

The second case was a more difficult operation,—a hysterectomy. This required one hour and a quarter, but the patient bore it remarkably well, her pulse and respiration being normal when she was put back in bed. Two hours later she was pulseless, pale, and anxious, and complained of a feeling of suffocation. As in the first case, no signs of internal hemorrhage were discoverable. In spite of the efforts at stimulation the patient's condition did not improve, but even grew worse. A subcutaneous injection of morphine was tried with immediate remarkable result. Improvement began forthwith, the pulse grew stronger, the dyspnoea disappeared, and within fifteen minutes the alarming symptoms had subsided.

The Effect of Alexander's Operation upon Labor, on the One Hand, and the Action of Pregnancy and Labor upon Alexander's Operation, on the Other. (*Centralblatt für Gynäkologie*, 1896, No. 21.) By Siegfried Stocker, M.D.

Of the thirty-seven patients on whom Stocker has performed Alexander's operation, sixteen were either single women, widows, or women who had passed the child-bearing age. Of the remaining twenty-one, ten—three of them for the second time—have become pregnant. One of these aborted in the second month, the other nine were delivered at term. Seven of the ten he examined and found the uterus in good position, the eighth was five months pregnant for the second time. Two of these women had been sterile for the two years of their married life, but became pregnant within six months after the operation. From his experience he concludes that Alexander's operation causes no disturbances in the course of future labors, and gives brilliant results in favoring conception.

Three Successful Cæsarean Sections upon the same Woman. (*Centralblatt für Gynäkologie*, 1896, No. 21.) By C. N. Van de Poll, M.D., of Amsterdam.

The first two sections on this woman were performed by the late Professor Van der Mey, and reported by him several years ago. Her pelvis was a generally contracted rachitic one, and her first three pregnancies resulted in the death of the child. She was told that a Cæsarean section would be necessary if she became pregnant again and wished a living child. Van der Mey performed this twice, each time delivering a healthy child. Seven years after the second one Van de Poll delivered the third child, but was forced to do a Porro on account of the broad, firm adhesions between the lower uterine wall and the abdominal wall. This child also lived and the woman is now perfectly well.

Ingenious Restoration of the Vagina. (*Centralblatt für Gynäkologie*, 1896, No. 21.) By A. Mackenrodt, M.D., of Berlin.

Mackenrodt suggests the transplanting of flaps, obtained from prolapse

operations on otherwise healthy women, to the granulating sides of the artificial vagina in cases of complete atresia. Of course, an attempt to restore the vagina is warranted only when the atresia is an acquired one, or, if congenital, when the uterus and tubes are sufficiently developed to carry on the generative functions. In attempting to restore the vagina in such cases great difficulty is experienced in keeping the granulating wound open long enough to allow the epithelium to extend up and cover the whole surface. To hasten the process he transplants flaps that he has obtained from the vagina of a woman suffering with prolapse. He first makes an opening between the labia in the position to be occupied by the new vagina, and then with his finger or a blunt instrument dissects an opening up to the external os or through it if the cervical canal has been occluded. The cavity thus formed is tamponned with iodoform gauze, and kept distended in this way until the whole surface is covered with healthy granulations. Then is the time for the transplanting; it may be done in one sitting or in several. The latter method takes much longer, as one graft must become firmly adherent before the next can be started, but is necessary owing to the difficulty of getting enough material to form a whole vagina at one operation.

Great care is necessary in the preparation of the flaps; they must be quite thin, of uniform thickness, and removed with great care not to injure the vitality of their tissue. The flaps, as soon as dissected off, are laid with their raw surfaces together in a warm sterile vessel until they may be used. After the flap or flaps have been fitted to the granulating surface they are intended to cover, they are kept in place with a tampon for ten days, during which time the patient must be at absolute rest in bed. In two cases on whom he has tried this method Mackenrodt claims to have obtained very satisfactory results.

Administration of Ovarian Tissue. (*Centralblatt für Gynäkologie*, 1896, No. 20.) By R. Chrobak, M.D., of Vienna.

Chrobak reports that he has tried the therapeutic effect of ovarian tissue in eight cases. To the first case he gave one and a half to two grammes (20–30 grains) of finely-chopped, fresh calves' ovaries, with a negative result. To the others he gave dried pulverized cows' ovaries compressed into pills of two-tenths gramme (3 grains) each. Six of these cases were women from whom the ovaries had been removed, who were suffering all the distressing symptoms of an artificial menopause; the other case was experiencing the symptoms of a physiological change of life.

In three of the cases in which the ovaries had been removed the treatment had been continued long enough to warrant a report. The first patient testified that after a two weeks' use of two to three pills daily the attacks of giddiness, flashes, etc., diminished from an average of ten to three per day, and entirely ceased at night. The second patient lost the attacks completely after twelve doses, and the third had on an average only half as many after she had taken twenty pellets.

The woman who was suffering from the physiological menopause stated that her symptoms were much less severe while she was using the drug.

All the patients bore the drug well and experienced no evil effects from its use.

OPHTHALMOLOGY.

IN CHARGE OF CHARLES A. OLIVER, A.M., M.D.,

Philadelphia, Pennsylvania,

AND

EDMUND LANDOLT, M.D.,

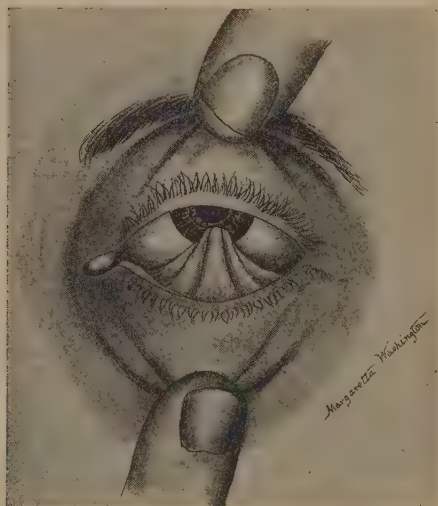
Paris, France.

Traumatic Pterygium, with a Comparative Study of the Refractive Condition of the Eye before and after Operation. (*Medical Fortnightly*, July 1, 1896.)

Charles A. Oliver, M.D., of Philadelphia, reports the case of a thirty-year-old colored man who fell from the rear platform of a trolley car. The patient sustained a series of superficial injuries about the upper portion of the left face, involving the lower lid and the inferior part of the eyeball. Although the wounds were carefully stitched by a competent physician, yet the resultant inflammation lasted for more than a month. Following the accident, the vision of the affected eye, which was as good as that of the right eye both before and for some time after the traumatism, began to grow progressively worse. At the time of the first examination, the cicatrices in the cheek and the lid were so faint and the tissues were so free and mobile that, upon casual examination, but very little if any deformity could be seen. Upon depressing but not everting the lower lid, as shown in the sketch, a broad pyramidal superficial area, situated upon the bulbar conjunctiva alone and extending from the lower cul-de-sac over the cornea to a point almost opposite to the lower pupillary border, could be seen. The mass, which was dense and vascular, was so adherent to the subjacent corneal tissue and underlying mucous membrane, of which it formed a part, that a probe could not be inserted beneath it at any point. Study of the remaining area of the cornea by magnifying lenses and the ophthalmoscope showed that the false membrane was drawn into a series of vertical folds. Uncorrected vision equalled one-tenth of normal ($\frac{5}{50}$), this being brought to one-third ($\frac{5}{15}$) by the use of a convex cylinder of three and one-half diopters strength, with its axis at 180 degrees. The right eye possessed full visual acuity. The growth was dissected free from its corneal attachments and excised. The exposed underlying submucous tissues were covered by bringing the free edges of the surrounding conjunctiva smoothly and neatly together by a series of minute and evenly placed sutures. In forty-eight hours' time the stitches were removed and seven days later the wound was healed. Ten

days after the operation uncorrected vision had risen to one-sixth of normal ($\frac{5}{30}$), it requiring but one diopter's correction of astigmatism at the same

FIG. 1.



axis as before in order to double the acuity of vision ($\frac{5}{15}$) (the same as before); this being but one-third of the cylinder lens strength that was necessary to be used before the operation.

The second and third eyes were both from a forty-five-year-old woman who died from multiple malignant growths.

The posterior halves of the two eyes were obtained, and microscopically the appearances corresponded very closely with those of the eye of the first case.

"In sections stained by Pal's method, the blue staining of the fibres in the optic nerves ceases abruptly at the lamina cribrosa, but in some sections fine-beaded, blue fibres can be seen passing through the lamina cribrosa. Blue stained fibres radiate in both directions from the optic disk, forming two triangular areas with their bases at the optic disk. The stained fibres at the apices at the two triangular areas lie in the posterior part of the nerve-fibre layer. Near the optic disk the stained areas occupy the whole thickness of the nerve-fibre layer of the retina. The retinal vessels near the optic disk are enclosed on all sides by the stained fibres. There are isolated stained fibres in the nerve-fibre layer. The minute structure of the stained fibres presents appearances similar to those in the first eye."

From these examinations the author draws the following conclusions. "The optic-nerve fibres lose their medullary sheath at the posterior part of the lamina cribrosa, with the exception of a comparatively small number which retain their sheath as far as the retina.

"The opaque nerve fibres in the retina, therefore, are composed of nerve fibres which again become medullated at the optic disk, and of the few fibres which retain their myeline sheath in passing through the lamina cribrosa.

"As regards the swellings on the medullated nerve fibres in the retina," he says that "the two forms evidently arise from different parts of the nerve fibres. The second form, the dark homogeneous swellings, from the character of their staining and from their situation seem, without doubt, to be thickened parts of the medullary sheath. The origin of the first form, the light homogeneous swellings, is not so clear. The medullary sheath, however, probably plays no important part in their formation, for it can be traced round the swellings unaltered in thickness and appearance. The origin must, therefore, be from the axis-cylinder, or from some substance between the axis-cylinder and the medullary sheath."

A Case of Binocular Extrapapillary Coloboma. (*Virginia Medical Semi-Monthly*, June 12, 1896.)

The accompanying outline sketches represent the vascular distribution in a case of binocular extrapapillary coloboma that has been carefully studied by John Dunn, of Richmond, Virginia. Sketch 1 shows the ophthalmoscopic appearance of a double coloboma (*A* and *B*) occupying

FIG. 1.



the macular region of the right eye. Here, as can be plainly seen, "the superior temporal vein of the retina crosses in a straight course the upper coloboma, subdividing just beyond its limit."

Sketch two shows the irregularly circular coloboma in the left eye. Here, as in the other eye, there is a torn pigment veil surrounding the

size. It "runs to the centre of the coloboma, where it rolls itself into a small ball, from which emerges but a thread of vessel, which can then be followed across the outer half of the coloboma."

The field of vision for the right eye is shown in Fig. 3. The field in the left eye showed that, in spite of the size and situation of the coloboma, there was not any absolute scotoma for white, the field for this color being normal. These facts are most important, as they distinctly prove that the colobomatous areas are more or less completely covered with retinal tissue, thus explaining why the scotoma and coloboma do not correspond in size and shape, and why there may be a large coloboma and no scotoma. Moreover, it must be assumed that in those cases "where the scotoma corresponds to the coloboma, both retinal and choroidal tissues are wanting over the area of the coloboma." Finally, as the author says, "the size of the scotoma will depend upon the amount of damage done to the overlying retinal tissue by those processes, whatever they may be, which determined the choroidal coloboma."

Medullated Nerve Fibres of the Human Retina: Microscopical Examination of Three Eyes. (*Ophthalmic Review*, January, 1896.)

C. H. Usher, of Aberdeen, has had the rare good fortune of securing three human eyes with medullated nerve fibres of the retina for microscopical examination. The eyes were hardened in Müller's fluid, embedded in celloidin, and cut with a freezing microtome. The sections were stained by Pal's method, with aniline blue and safranin (Ströbe), by Kultschitzky's logwood and eosin stain, and by a double stain with Pal's method and alum carmine.

The microscopical examination of the sections of the first case—a forty-year-old man, who died from phthisis pulmonalis, stained by Pal's method—showed under low power the appearance seen in Fig. 1.

"(1) The blue staining of the optic-nerve fibres comes to an abrupt termination at the posterior part of the lamina cribrosa.

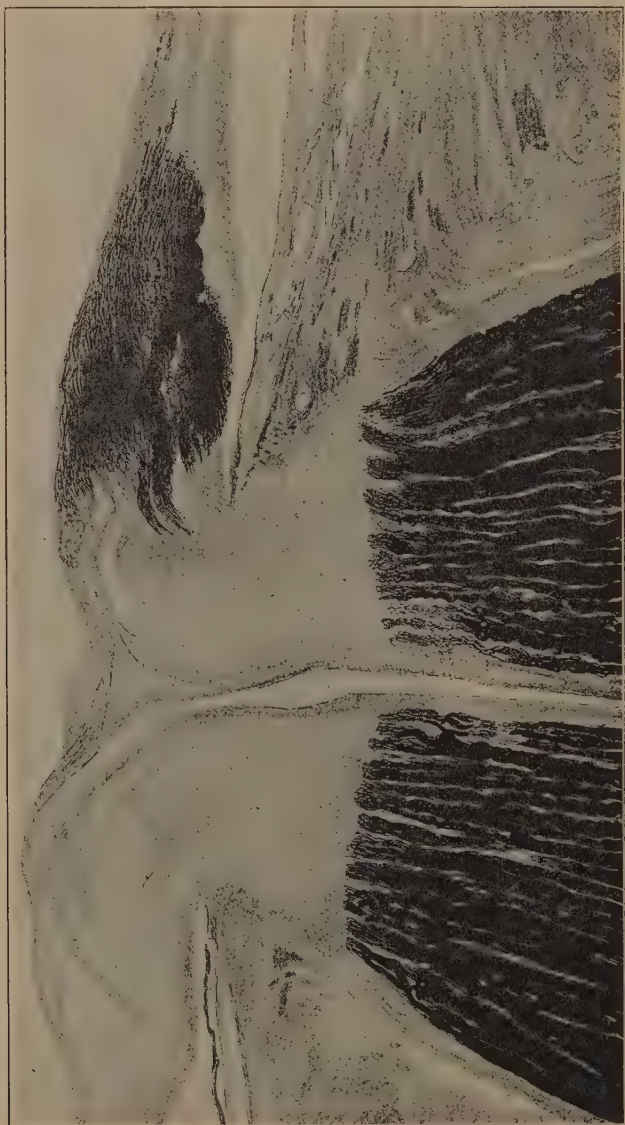
"(2) No stained fibres can be traced through the lamina cribrosa.

"(3) An exceedingly well-defined blue area in the retinal nerve-fibre layer begins on the optic disk near its upper edge, and extends upwards; the broadest part of the area is at the edge of the optic disk; it gradually narrows towards the upper part of the retina, forming roughly a triangle with its apex pointing away from the optic disk. This stained area occupies the whole thickness of the nerve-fibre layer at the disk; towards the apex of the triangle the stained fibres are much fewer in number and lie at the posterior part of the nerve-fibre layer.

"(4) A few blue-stained fibres are seen further away from the optic disk than the apex of the main area, being separated from the main area by a portion of the retina that is free from stained fibres; these isolated fibres lie at various levels in the nerve-fibre layer; some are situated anteriorly, others posteriorly.

“(5) Stained fibres are seen in the nerve-fibre layer below the optic disk, in a few sections only; these fibres are situated at a short distance

FIG. 1.



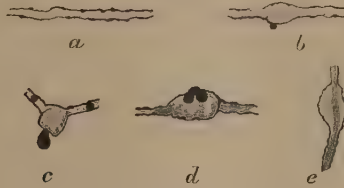
A section from the first case stained by Pal's method. $\times 50$.

from the optic disk and are very few in number. In sections made through the edge of the opaque patch only a very few stained fibres are seen; they lie at various levels in the nerve-fibre layer. In one section only two

stained fibres are seen, and both are situated at a short distance from the optic disk.

"(6) The stained fibres have small swellings on them. With a high power the minute structure of the stained fibres in the retina is seen to be as follows (Fig. 2): Each stained fibre is composed of a homogeneous sub-

FIG. 2.



Types of medullated nerve fibres in the retina, drawn from a section from the first case, stained by Pal's method. (High power, Reichert, oc. 4, obj. No. 7 a.)

stance, and is lined by a thin, dark-colored margin (*a*); the margin is not of uniform thickness, but at very short and fairly regular intervals there are very minute thickenings on it. The swellings, which were seen by the low power, are now found to be of two forms: (1) A light-colored homogeneous swelling, varying much in size and shape; some are spindle-shaped, and situated in the axis of the fibres (*b*); others are more rounded and bulge from the sides of the fibres; they measure from .005 to .020 millimetre in diameter, and they have various but generally rounded shapes; here and there is seen a group of very small swellings similar to that just described. Each swelling is surrounded by a thin dark margin of the same thickness, and presenting the same small thickenings as are seen on the nerve fibres. Some of the swellings are slightly lighter in color than the fibres, and in a few a band can be focussed in their centre (*c*). That the band occupies this situation is probable from the fact that with high magnification it is in focus at the same time as the dark margin of swelling. This band is slightly darker than the swelling it appears to pass through, but is lighter than the margin of the swelling; it seems to be continuous at each end with the homogeneous central part of the nerve fibre that is connected with the swelling. There is a possibility that this band may, in some cases at least, be another nerve fibre lying under the swelling, but the absence of dark margins is contrary to this view.

"(2) The second form of swelling is darkly stained and has great variety of shape and size, the largest measuring from .005 to .025 millimetre in length, the smallest being about the same size as the delicate thickenings on the margin of the nerve fibres. Many have a circular outline, others are irregular in shape. They are situated on the nerve fibres (*c*) and on the first form of swelling (*d*), or else they project from the margin of the nerve-fibres or swellings (*e*). A few of this second form of swelling at first sight appear quite isolated, but in nearly every case, on close focussing, a fibre is

found to lead up to them. In sections treated with aniline blue and safranin (Stræbe) swellings are stained blue on the medullated nerve fibres, but are apparently fewer in number than the swellings seen in the sections stained by Pal's method; they measure about .015 millimetre in length and .010 millimetre in breadth, but vary in size; they are for the most part spindle-shaped. Stained with a double stain of alum carmine and Pal's stain, the appearance of the medullated fibres is very little different from that in sections stained by Pal's stain alone; the central part of the fibres and swellings remained unstained, although left in alum carmine for twenty-four hours."

PATHOLOGY.

IN CHARGE OF ALLEN J. SMITH, A.M., M.D.,

Professor of Pathology in the Medical Department of the University of Texas, Galveston, Texas,

AND

HENRY W. CATTELL, A.M., M.D.,

Demonstrator of Morbid Anatomy in the University of Pennsylvania; Prosecutor to the American Anthropometric Society; and Pathologist to the Presbyterian Hospital, the Institution for Feeble-Minded Children at Elwyn, etc.

On a Special Action of the Serum of Highly Immunized Animals.
(*Journal of Pathology and Bacteriology*, July, 1896.) By Herbert E. Durham, M.D.

The writer, while testing the limits of Professor Pfeiffer's method of diagnosing cholera vibrios from other closely allied vibrios, observed a most remarkable effect of the immunized serum upon different bacteria. The purpose of this article is to point out the use and limits of the phenomenon as a means of diagnosis, as a means of testing the potency of a given serum, as a means of testing the virulence of a given race of microbes, and, lastly, to indicate the relation that it has to the test proposed by Professor Pfeiffer.

"Pfeiffer's reaction" is obtained by injecting a mixture of an emulsion of the vibrios which are to be tested, with a minute quantity of the serum of a very highly immunized animal, into the peritoneal cavity of a normal guinea-pig. If the reaction is positive all the vibrios are converted into spherules in an hour or less; according to Pfeiffer, the vibrio is then to be regarded as belonging to the *same* species as that by means of which the immunization of the animal from which the serum was obtained was carried on. If the reaction is negative, the vibrio is then considered to be different in species from that used in immunization.

While making the mixture for the first injection, the writer noticed an instantaneous agglomeration of the vibrios into clumps, combined with loss of motility. This reaction of like sorts of serum on like sorts of bacteria may be best illustrated by taking the cholera vibrio as a type. The change occurs on the instant that the vibrio is placed in the serum.

A microscopical examination then shows that the vibrios are agglutinated into clumps, the fluid is free from scattered vibrios, and motility is entirely lost. There is loss of refractile power in many of the organisms and some loss of staining power. Observation with the naked eye shows flocculi suspended in the liquid, which sink to the bottom of the tube after a time, giving a clear fluid with a flocculent deposit at the bottom.

A gravitation of the vibrios leaving the fluid perfectly clear is termed a "complete action." A serum is said to be of unit standard strength when it reacts completely in an hour with its own microbe in a strength of one per cent. In weaker mixtures of a like serum the formation of the clumps can be readily watched. Vibrios that happen to hit a clump or another individual are then seen to remain adherent and to be unable to free themselves. In extreme dilutions of the active serum the fluid never becomes clear, and if it remains at all turbid, actively motile vibrios will be found microscopically.

The writer's effort to produce clumps by other means, as by the fluids of normal animals or by the serum of an animal immunized against some distantly-related organism, have failed.

In testing the action of cholera serum on different races of cholera vibrios it was found that, while the cholera serum produced by the more virulent vibrios reacts well with the less virulent, the opposite effect is not obtained; for only the less virulent cultures are powerfully affected by the serum produced by the weaker stocks. For this reason a sufficiently potent sample of cholera serum should be used for purposes of diagnosis.

Other kinds of vibrios were found to give a positive reaction when tested with their own serum; with allied species the sera may or may not be potent.

A great number of observations were made upon the typhoid and colon bacillus with a view to facilitate a differential diagnosis. Of nineteen cultures of the typhoid bacillus obtained from different sources, every one reacted strongly with ten to fifteen milligrammes of either of the typhoid sera used, but not a single one showed a vestige of clump formation when treated with the coli serum.

The colon bacillus reacts upon its own race of bacilli exactly like the typhoid serum upon the typhoid bacilli; but it does not give the faintest trace of a reaction with either of the samples of typhoid serum.

In regard to the relation of this reaction to Pfeiffer's test, the writer concludes that whatever "specific" or preferably "specialized" action a serum has upon a given vibrio, such action has already taken place before the injection is made.

A. W. P.

FORENSIC MEDICINE.

IN CHARGE OF LORENZO D. BULETTE,
Of the Philadelphia Bar.

COUNTERCLAIM FOR PHYSICIAN'S SERVICES ALLOWED IN AN ACTION AGAINST HIM FOR MALPRACTICE.

THE Supreme Court of Iowa, in a recent case¹ brought before it on appeal by the plaintiff from a judgment entered on a verdict in his favor in an action for damages against a physician and surgeon for alleged malpractice in reducing a fracture of the plaintiff's arm, laid down a rule of law that seems to be peculiar to that State, and at a variance with the rule of law adopted in similar cases in the other States of the United States. The Supreme Court of Iowa declares that the fact that a physician was guilty of negligence in the treatment of his patient, resulting in damages to the latter, does not necessarily preclude him from recovering any compensation whatever for his services, the amount of his recovery, if anything, depending on the amount of damages suffered because of his negligence.

The testimony at the trial in the lower court showed that the plaintiff had sustained a simple oblique fracture of the humerus of the left arm. He employed the defendant to reduce the fracture, and claims that by reason of the negligent and unskilful treatment he received his arm is useless, and he is permanently disabled. The defendant admitted that he was called upon to set the plaintiff's arm, but denied any negligence or unskilfulness in so doing; and he claimed that, after he had ceased the treatment and discharged the case, the plaintiff, while carrying some heavy article, slipped and fell, and injured his arm, and that he neglected to notify defendant thereof, or to call any other physician to treat the same, and that, by reason thereof his arm is bent and injured, and that the present condition of the plaintiff's arm is due to his own negligence and the accident aforesaid. The defendant further pleaded a counterclaim for services rendered the plaintiff in reducing the fracture. The jury returned a verdict for plaintiff in the sum of one dollar, and from the judgment entered on this verdict the plaintiff appealed.

Among the errors complained of was one to the charge of the court instructing the jury as to the measure of damages, as follows: "You will determine the amount, if anything, due the plaintiff on this claim, and the

¹ *White vs. Hale*, 66 N. W. Rep. 894 (1896).

amount, if anything due the defendant on his counterclaim, and, after deducting the lesser from the greater amount, you will return your verdict for the difference, if any, in favor of the plaintiff or defendant, as you find the fact to be. If you find nothing due either party, you will simply return a verdict in favor of the defendant."

To this charge of the trial court the plaintiff's counsel excepted, his contention being that the two claims for service and malpractice cannot co-exist, and that a recovery by either is a bar to an action by the other. "That there are some authorities," says the Supreme Court, "in support of plaintiff's contention will be conceded; but we do not think these cases announce the correct doctrine. The rule in this State, long ago established, is that a party who has failed to perform his contract in full may recover compensation for the part performed, less the damages caused by his failure to perform the whole contract. It does not necessarily follow that, because a physician or surgeon may be guilty of negligence, which causes some inconsequential or inconsiderable injury, he is to be deprived of all compensation for his services on account thereof. Whether he shall lose the value of his services depends upon the amount of damages suffered by reason of his neglect to perform his duty. No penalty beyond the amount of the actual damages sustained is to be visited upon him because of his negligence or want of skill." And the judgment of the trial court was accordingly affirmed.

It is to be observed, however, that the rule of law contended for by the plaintiff, in this case,—namely, that a recovery by a physician or surgeon for his services will constitute a bar to an action by his patient for malpractice, or, on the other hand, that a recovery of damages by a patient in an action against his physician for malpractice is a bar to the latter's recovery of compensation,—announces the law prevailing in the States of the United States, perhaps with this exception. And the point may well admit of reargument before the Supreme Court of Iowa.

BOOK REVIEWS.

THE HISTORY OF PROSTITUTION; ITS EXTENT, CAUSES, AND EFFECTS THROUGHOUT THE WORLD. By Wm. Sanger, M.D., Resident Physician of Blackwell's Island, New York City; Member of the American Association for the Advancement of Science; late Physician to Marine Hospital, Quarantine, New York, etc., with Numerous Editorial Notes and an Appendix. New York: The American Medical Press, 1895. 816 Broadway.

Undoubtedly Dr. Sanger, in undertaking his work, hoped to arrive at facts and conclusions which might form a valuable basis for efforts to ameliorate or suppress prostitution. Diving for his truth into a very malodorous cesspool, he seems somewhat disappointed himself when he emerges with the results of his find.

For what is the result? From earliest ages he finds prostitution rampant in every age and every clime, and wherever and whenever efforts at its suppression were undertaken, he finds it under new forms, hidden, but still more pernicious; under the smiles as under the frowns of religion and the state, it grows with the growth and contributes to the decay of many a promising body politic.

Possibly the difficulty experienced in all efforts at reforming and obliterating this dark spot in society comes from ignoring the fact that passion and want are the two fundamental instincts upon which depend the existence of man, and that society in its war against prostitution is fighting immutable laws and vast unseen forces that laugh at morals, care not for religions, but extend their mighty roots far down, through men and animal and plant-life into the very realm of the inorganic world; that the enticements of sex and the pangs of hunger are equally important if man is to continue on the earth, and that in prostitution we have to meet a union of both against which organized society wars forever in vain.

Make the enticement valueless and none will desire it; grant its rewards to all who ask and none may ask more; enforce the marriage of all as soon as the age of desire is reached, and none may seek illicit union; or, again, abolish want and none will need to try this way of earning the bread with which to sustain life or the covering to keep out the cold. Or diminish the attractions of the female sex for the male. All these methods of attacking the evil would be scientific and rational; but to suggest, as Dr. Sanger seems to, a law making marriage before twenty-five a penal offence seems the height of absurdity.

In fact all reformatory methods upon which modern society plumes itself are but a gleaning of the scattered grain, while prostitution sweeps away the ripened harvest.

Society, sad to say, saves too often the sexual virtue of its few at the expense of its many, as fortunes accumulate for the few on the ruin of the rest. Yet who can blame it? Only one sometimes smiles at its outcry against the evils that itself, by its very existence, of necessity creates, and by which and on which, rotten foundation though it be, it lifts its own favored and dear ones aloft in the sunshine of life and the purity of the mountain air, while below, under its feet, in the fetid marshes and tangled thickets, it stamps regretfully a million down the deeper into the mire of suffering and sin.

EDWARD W. WATSON.

DIETS FOR CHILDREN. By Louis Starr, M.D. Price, \$1.25. Philadelphia: W. B. Saunders, 1896.

This collection of dietaries will prove very useful to physicians in the management of children, both sick and well. They are arranged under twenty-one heads, after which follows a set of charts for the preparation of different diluents and foods. By detaching the sheets and making such adaptations as will be necessary in individual cases, both physician and parent will be able to pursue a more intelligent plan in regard to diet than is customary in general practice. The high standing of the author is a sufficient guarantee of the trustworthy character of the book. G. H.

THE TOXIC AMBLYOPIAS: THEIR CLASSIFICATION, HISTORY, SYMPTOMS, PATHOLOGY, AND TREATMENT. Being an essay to which was awarded the Alvarenza Prize of the College of Physicians of Philadelphia, October, 1894. By G. E. de Schweinitz, A.M., M.D. Philadelphia: Lea Brothers & Co., 1896.

The study of the toxic influences exerted on workmen and others by the multitude of substances for which our civilization has found a use is of great and increasing importance. Of this study in its wider sense the present volume deals with those organs in which alone, if we except the blood, we are able to examine the progress of minute tissue-changes during life. The general medical reader may, therefore, take up the book with the anticipation of a lively interest.

Using the term amblyopia in its broad etymological sense of "dimness of sight" the expression toxic amblyopia includes every loss of visual function, whether for form, light, or color, due to the influence of a drug. Excluding the "dimness of sight" due to the paralysis of accommodation and that due to glaucomatous symptoms following the use of mydriatics, the subject still embraces practically the entire range of ocular drug action. Following Leber, the modern monographers cover all of the field within these wide limits, and one is, therefore, in a measure prepared for the number and variety of the toxic substances which an industrious search among case-reports brings to light. The present author's list is longer than that of any of his predecessors, containing, as it does, over eighty agents. Some of these, however, are only mentioned in order to deny the amblyopic properties elsewhere attributed to them. The classification of such diverse materials as this list contains by any system dependent on chemical or therapeutic affinities is a task which is wisely not attempted. Each substance has, therefore, received separate consideration, though they have been formed into groups for convenience of treatment.

The reader will be apt to turn to the chapters on alcohol and tobacco as furnishing the most familiar evidence of the quality of the book. Over one-third of the pages are devoted to these substances, and it must at once be admitted that the work is extremely well done. Particularly admirable is the exhaustive study of the visual fields, which bears so large a part in the practical diagnosis of alcohol and tobacco amblyopia, and the clearness of the differential diagnosis from non-toxic axial neuritis, locomotor ataxia, and scotomatous atrophy of the optic disk.

The amblyopias are diseases of commission rather than of omission, and the diagnosis, therefore, almost includes the treatment. The paragraphs which the author devotes to this subject contain judicious reference to all the measures which have been found useful in conjunction with the withdrawal of the toxic agent.

We have not space to follow in detail the interesting chapters on bisulphide of carbon amblyopia, which has not yet been reported from this side of the Atlantic; on iodoform amblyopia, of which the reported cases number only four, and on the various useful substances which have occasionally proven detrimental to the eyesight. These chapters will prove valuable to topical inquirers, containing, as they do, in a condensed form much information of a special kind that is not generally accessible. The various ocular lesions which lead is capable of causing have, perhaps, received less

attention than one would expect in view of their destructive nature and their similarity to non-toxic affections. The author regards as proven that lead produces optic neuritis independently of nephritis or cerebritis.

The record of the experiments in the production of quinine amaurosis in dogs have already been printed, but are well worthy their new dress and permanent form. The general subject of quinine amaurosis is treated in a careful chapter which forms one of the most enjoyable sections of the book. In addition to those with the salts of cinchona bark the essay contains records of experiments with alcohol, salicylic acid and salicylates, and male fern.

For the book as a whole one can have only genial words. Its special features, aside from those which we have pointed out in the text, are the nine beautiful plates, principally of microscopic sections, and the very complete and exact bibliography accompanying each section. The care and industry which have gone into these lists of references will place future students of this subject long in debt to de Schweinitz's scholarly monograph.

R. J. P.

ANNUAL REPORT OF THE BUREAU OF HEALTH OF PHILADELPHIA, 1895.

This report contains valuable information as to the safeguards that are thrown around the inhabitants of a great city. The favorable condition of Philadelphia's health reflects great credit on its health bureau. The city, from having, probably, the poorest paved streets of any large city in the country, has now the best, and it is not only the main streets that have been improved but a large number of the small streets and courts have been reconstructed by the introduction of proper drainage and impervious pavements, all conducive of cleanliness, which is of the utmost importance. The removal in summer of thousands of children daily by the fresh-air excursions has had a very beneficial influence on the health of young children. Among the safeguards in force is the active inspection of milk. Thirty-five prosecutions were brought, and in eleven cases the parties pleaded guilty. Milk and water analyses and examinations of sputum and of suspected diphtheria are made without cost in the city's biological laboratory. During the year one hundred and forty-five thousand head of cattle were inspected, and one hundred and sixty-two were condemned and destroyed. Of these one hundred and twenty-nine were affected with tuberculosis, five with actinomycosis, and twenty-six with various other diseases. Ten persons were arrested and held for trial for selling, or exposing for sale, unwholesome flesh.

Philadelphia also requires the examination and registration of plumbers. Of one hundred and sixty-four applicants fifty-six were rejected. In two instances plumbers have been disciplined for flagrant disregard of the rules of the board regulating house-drainage. All these measures are highly salutary, and are being rewarded by a falling death-rate.

Publications of this nature ought to have an index.

G. H.

ROYAL INFIRMARY CLINQUES. By Alexander James, M.D., F.R.C.P.E. 8vo, pp. 166. Edinburgh: Oliver & Boyd, 1896, 5s.

Sixteen lectures are contained in this volume. The subjects have been closely studied and by means of numerous illustrations one follows with interest the cases as they are presented. The subjects chosen are empyema; fibroid phthisis; cardiac disease; primary contracting kidney; hydronephrosis treated by aspiration; diabetes; two cases of cirrhosis of the liver in children; dysentery treated by demetized ipecacuanha; aortic aneurism; epilepsy; spinal injury; a case of Friedreich's ataxy, in which, by the way, there was no evidence of heredity. Eleven such cases were recorded in Griffith's monograph. Tracings are given of the sway in this case taken by means of the taxograph. With his eyes open the lines were

fairly even, but when they were closed the undulations were marked, exactly as in the case of an ataxic patient.

Lectures on combined paralysis of the arm due to injury, a case of lesion of the pons, and a case of Addison's disease, with good photographic illustrations complete the book. G. H.

A TEXT-BOOK OF BACTERIOLOGY. By George M. Sternberg, M.D., LL.D., Surgeon General U. S. Army. Octavo, 693 pages, illustrated by heliotypes and chromolithographic plates and 200 engravings. New York: William Wood & Co., 1896.

The essential difference between "The Text-Book" and "The Manual of Bacteriology," which appeared from the same author in 1892, is that the former is less bulky than the latter, and in many other ways more suited to the needs of a larger number of readers. In constructing "The Text-Book" from "The Manual" the alterations have been mainly subtractive. The bibliography and certain detailed discussions, which made "The Manual" especially useful to the specialist as a reference book, have been eliminated from "The Text-Book," likewise the descriptions of a number of non-pathogenic species which were of little importance or interest to the general readers have been omitted. On the whole, these changes appear to be for the good of the book, in so far as its popularity is concerned: they decrease its size, diminish its cost, and thereby insure its wider circulation.

The subject-matter is presented under four parts, subdivided into headings.

Part I.—Includes history, morphology, and general technique.

Part II.—General biological considerations, including a detailed consideration of the subject of disinfection.

Part III.—Comprises descriptions of pathogenic species of bacteria.

Part IV.—Treats of saprophytic bacteria.

The mechanical features of the book are good.

A. C. A.

NYNAISM. Pamphlet, pp. 122. Philadelphia: Nyna Publishing Company, 1896.

We see the birth of another *ism*. Nynaism, which owes its origin to inspiration derived from the publications of the Ralston Health Club, is the mystic name for a society, clique, club, association, principle, or whatever one wishes to call it, the object of which is to induce the perverse human being to adhere to the rules of hygiene, to influence these same human beings to stop taking quack and patent medicines, and to bring about the return of the human race to rules of living which will result in vigorous old age. In a word, as the introduction has it, the *ism* is an attempt to "popularize hygiene." Nyna, when translated into English, means nine a's, at least so the reviewer gathers from the perusal of the pamphlet. These nine a's are administrativeness, activeness, agreeableness, alimentation, aeration, appeasement, accoutrement, ablution, and actinism. Perfection in these qualities is to be striven for by daily exercises, one exercise for each quality. These exercises are in corresponding order: approximation, focalization, conciliation, mastication, inflation, relaxation, protection, humidation, ventilation.

Those who are willing to join the movement are exponents; each exponent endeavors to obtain other exponents; and ultimately, in the words of Colonel Mulberry Sellers, there will be millions in it. If the human race in a body should flock to the standard of the new *ism* we would ultimately see the world peopled by beings who would be devoid of nerves, who would possess unclouded intellectual faculties and clear-cut vision, and who would be above petty annoyances. Further, these ideal individuals would masticate their food properly, would use their respiratory apparatuses thoroughly, and would always obtain a sufficient amount of rest. Besides all this, we would find them properly clothed, cleanly in body, and living in houses

which would be properly ventilated. And, finally, they would cease experimenting on their own animal economies with the evil concoctions of the patent medicine man. Seriously, there is something in this new move if it can be popularized, and, even if the ideal is not reached, much may be done to improve the condition of the people.

No names appear connected with the movement, and the future alone will tell whether it is destined to be successful, as it is a notoriously difficult task to induce people to take care of themselves.

J. M. S.

ITEMS OF INTEREST.

THE issues of the *British Medical Journal* and of the *Lancet*, under the date of September 5, 1896, are known as the students' number. In these journals voluminous information is given the English student about beginning his education. From this material we may glean some interesting facts. It would seem that the General Medical Council determines the main outline of the medical curriculum. This council lays down the minimum standard of school knowledge which shall be possessed by a student before he commences his professional study and the minimum number of years during which such study shall be carried out, and at the same time enumerates the examining bodies, the possession of whose degrees and diplomas shall entitle the holder to be registered as a medical practitioner. The various medical schools, so long as they comply with the instructions of the council, arrange their examinations as they like, and grant such diplomas and degrees as their various charters call for. Every medical student must be registered by the General Medical Council at the commencement of his studentship. In order to be able to register a student must pass a preliminary examination in general education, and must produce evidence that he has commenced medical study. A list of ninety examining bodies is given, whose examinations in general education are recognized by the council. These examinations require as a minimum of education about what is required for entrance into any of our prominent American universities. The subjects in which examinations are held are:

- (a) English Language, including Grammar and Composition.
- (b) Latin, including Grammar, translation from specified authors, and translations of easy passages not taken from such authors.
- (c) Mathematics, comprising (a) Arithmetic; (b) Algebra, as far as through simple equations; (c) Geometry, the subject matter of Euclid, Books i., ii., and iii., with easy deductions.
- (d) One of the following optional subjects: (a) Greek; (β) French;

(γ) German; (δ) Italian; (ε) any other modern language; (ζ) Logic. After a student is registered with the council he may choose the medical school at which he is to take his final examination. The course of study for the professional degree must be five years, unless the student be a graduate in arts or science of any university recognized by the General Medical Council, who has spent a year in the study of Physics, Chemistry, and Biology and has passed examinations in these subjects. Such a student is considered to have completed one of the five years of study. The course of professional study and examinations must include the following subjects: Physics, Chemistry, Elementary Biology, Anatomy, Physiology, *Materia Medica* and Pharmacy, Pathology, Therapeutics, Medicine, including Medical Anatomy and Clinical Medicine, Surgery, including Surgical Anatomy and Clinical Surgery, Midwifery, including Diseases peculiar to Women and to Newborn Children, Theory and Practice of Vaccination, Forensic Medicine, Hygiene, and Mental Disease.

"The attention of the student," says the *Lancet*, "to these, according to our examining bodies, is at present so deficient that in 1892 out of two thousand six hundred and twelve examinations in the final subjects there were one thousand and seventeen rejections." Mr. Teale has laid the blame of this large number of rejections at the door of the teaching and examining system. The cost of the five years' study, including books, instruments, board, clothing, etc., is estimated by the *British Medical Journal* at from £687 to £734 3s., or from, in round numbers, \$2935.00 to \$3671.00 in American money. The *Lancet* considers that each student should be able to command £100 (\$500) per year regularly for at least four out of the five years of his curriculum, making the total cost for the five years £500 or \$2500.00 of our money.

The *American Medico-Surgical Bulletin* informs us that Dr. Irwin, who was a member of the suite attached to the person of Li Hung Chang on his recent visit to this country, is of English parentage.

Li Hung Chang's
Physicians. Dr. Irwin had met with some distinction in his hospital work in England, and went out to China in 1876. He settled at Tien-Tsin, the home of Li Hung Chang, and a short time after his settlement there he was called to attend a severe case in the imperial yamen. The patient recovered, and not long afterwards Dr. Irwin was appointed chief physician to the viceroy and his family. Li Hung Chang's wife was among the patients of Dr. Irwin, and was also one of his fast friends. Dr. Irwin has received the honor of the imperial order of the Double Dragon through the influence of his noble patron, and during the recent Chino-Japanese war was advanced in the order for valuable services rendered to the medical department of the Chinese army. While in this country Dr. Irwin took particular pains to deny the stories

which were put in circulation, to the effect that Li Hung Chang and the official members of his party were addicted to the opium habit. Dr. Irwin explicitly stated that not only was the viceroy not given to opium-smoking, but that that habit was one which he most thoroughly detested, and which he had made most strenuous efforts to discourage among his own nationality. The viceroy is an habitual tobacco-smoker, using both pipe and cigarettes. The second physician of the viceroy's suite, Dr. Mark, is a full-blooded Chinese, who for some reason has assumed a Christian name. He is reported to be a skilled physician.

NOTE TO CONTRIBUTORS.

AUTHORS will receive liberal compensation for accepted articles after publication; or reprints, if stated on the manuscript, will be furnished in lieu of the honorarium. It is distinctly understood that all articles appearing as original matter are for our exclusive use, and are not to be reprinted or to appear in any other publication excepting the Transactions of the Society before which the paper may have been read. Illustrated papers are especially desired.

All matters of business, as well as subscriptions, should be sent to the INTERNATIONAL MEDICAL MAGAZINE COMPANY, 716 Filbert Street, Philadelphia.

Manuscripts, exchanges, and books for review should be addressed to the Editorial Office, 3709 Spruce Street, Philadelphia.